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The influence of demographic, achievement and socioeconomic factors on proportions of students with disabilities

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The influence of demographic, achievement and socioeconomic factors on proportions of students with disabilities

by

Jeananne Reister Hagen

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CHAPTER I

INTRODUCTION

Rapidly expanding costs of special education services has raised questions about funding procedures, equity in the distribution of scarce resources, and the appropriateness of wide variations in the proportions of students with disabilities among states and local educational agencies. Local school districts and states identify markedly different proportions of their student populations as having disabilities. Special education services, by law, must be provided to virtually all students with disabilities leading to concerns about overall costs and equity in distribution of scarce resources. An initial issue addressed in this research is whether these wide variations in proportions of students with disabilities can be justified by differences in achievement, demographic, and socioeconomic characteristics among school districts.

Since federal legislation was enacted in 1975 requiring schools to provide appropriate education for students with disabilities, the number of students in special education programs has increased by 26%, from 3.70 million students in 1976-77 to 4.59 million students in 1989-90. There are indications that this trend will continue. Between the 1988-89 and 1989-90 school year the number of identified special education students in the nation rose by 2.1%, the largest percentage increase since 1980-81. The number of students placed in special education varies widely by state. For example, in Massachusetts nearly 17% of students are in special education, while fewer than 7% of students are in special education programs in Hawaii (Twelfth Annual Report to Congress on the Implementation of the Education of the Handicapped Act, 1990).

The national cost of providing special education services is estimated to exceed $16 billion dollars from local, state, and federal sources. In 1985-86, it was estimated that the average cost of educating a special education student exceeded the cost for the education of a general education student by $3652 each year. This average figure for the excess cost of educating a special education student in 1985-86 represented an increase of 31% in costs over the 1982-83 school year (Twelfth Annual Report to Congress on the Implementation of the Education of the Handicapped Act, 1990).

Iowa's situation parallels that of the nation. The percentage of children in Iowa's schools identified and served in special education instructional programs has increased from 5.40% in the 1975-76 school year, the first year of comprehensive state supported funding for special education programs, to 9.57% of the general enrollment in 1990. The additional cost of providing special education instructional services represents about 16% of total expenditures for public school instruction in Iowa. The cost of providing those services has risen by 52.3% since 1980, compared with a rise of 47.1% for non-special education programs and services (The Financing of Special Education in Iowa, 1990).

The continued growth in the numbers of students identified as requiring special education services during a time when general school enrollments have declined has been a cause of great concern to state policy makers. The Iowa Department of Education has conducted two studies of special education finance within the past two years. In the fall of 1990, the Bureau of Special Education in the Department of Education published recommendations for changes in the current funding system. Because these recommendations proved controversial among educators and policy makers, in the spring of 1991 the Director of the Department of Education appointed a task force made up of persons representing a wide variety of educational interests to conduct another study of

special education funding. The charge to the task force was to examine the current special education funding system, consider alternatives, and make recommendations for changes.

In September, 1991, the task force report on special education finance was submitted to the State Board of Education and to an interim legislative committee studying special education. The report contained 11 recommendations for changes in the current system of special education. The task force report was similar to the earlier report by the Department of Education in that it concluded that there was a need to place limits on the increasing costs of special education. Given that there would be limits in future funding to school districts, the major recommendation of the task force was designed to more equitably distribute available funds among the school districts. Wide variations were found among school districts in the proportion of students being served in special education programs. School districts served between 2.15% and 15.73% of their student population in programs for students with mild and moderate disabilities and between 0% and 4.14% of their students in programs for students with severe disabilities (Special Education Finance Task Force Report, 1991).

Two assumptions about the distribution of special education students are inherent in the task force recommendations and need to be tested. The task force recommended the redistribution of funds for the education of students with mild and moderate disabilities based upon a state average percentage of students served in those programs. The task force recommended that students with severe disabilities continue to be funded on a per pupil basis with no limits set as to the number of such students a district or area education agency might identify. This assumes that the proportion of students in special education programs for the mildly and moderately disabled should be more consistent across school districts than it is. The second assumption is that the proportion of students in programs for the severely disabled should not be expected to be the same across school districts.

There is not general agreement among educators that these assumptions are true. It is often argued that each school district has unique characteristics which create unique needs and therefore variations among districts in the proportion of students served in special education programs would be expected. The Urban Education Network, an association made up of the eight largest school districts in Iowa, issued a statement in reaction to the finance proposal in which they claimed that, "National data and literature has historically documented that urban areas have a significantly larger percentage of social problems, poverty, minority populations, crime, etc." (Daeschner, 1990). It was their opinion that these large concentrations of low socioeconomic student populations created a situation where proportionately more students need to be served in special education programs in the urban schools than in the rural schools of Iowa. An opposing view was presented by a group representing rural schools of Iowa. They reported that the availability of cheap housing in rural communities has created a situation where many families of lower socioeconomic status have moved to rural, smaller school districts. In their opinion, a disproportionate number of the children in these families require special education (Jess, 1990).

School superintendents were invited to a series of regional meetings in order to react to the proposed new finance plan. In explaining their concern for the changes being considered, they cited such things as high pupil-teacher ratios in general education, large numbers of students living in poverty, depressed property values, lower than average student achievement, and low educational attainment of the citizens of the school district as factors that influence the proportion of the students within a school district who are in special education programs. One superintendent summarized the concern as follows: "The relationship between poverty and the special education incidence rate needs to be more thoroughly investigated and the results of such a study need to be published.. There is

obviously a reason for the wide disparity in percentages of students identified for special education between districts. The bureau should try very hard to understand the reasons before making decisions about a future funding base" (Clinefelter, 1990).

This study will examine the relationship between achievement, demographic, and socioeconomic factors and differences in proportions of students served in special education programs in Iowa. This research should assist policy makers and educators in better understanding the issues involved in decisions which lead to the equitable distribution of resources for special education.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review has been divided into four sections. The first section describes the special education funding system in public schools which includes: the historical development of such programs, the legal context for a state's obligation to fund special education, and a description of the funding system for special education programs in Iowa. Section two of the literature review traces the growth of the special education population since 1975 and describes the attending fiscal problems this growth has presented. This research investigated factors related to the development of an equitable basis for the distribution of funds for special education; hence school finance research and questions of equity at the national and state level are reviewed in the third section of the literature review. This information provides a starting point for the fourth section of the literature review, the examination of previous research on relationships between certain achievement, demographic, and socioeconomic factors and the numbers of students requiring special education programs. The relationships between achievement, demographic, and socioeconomic factors and the proportion of students served in special education need to be considered in the development of an equitable distribution formula for special education fiscal resources.

Description of Public School Funding for Special Education

Historical development of special education programs

As part of a study to develop state special education fiscal policy so that appropriate special education services can be provided to students with disabilities, it is important to review the shifts in the role of the state in providing special education services. Weintraub and Higgins (1980) categorized the history of state fiscal support for special education into three phases. Weintraub describes the initial role of the state as that of benefactor. The support of special education programs was perceived by many as being a charitable activity of state government. The provision of services for children with disabilities was random and permissive, most often being influenced by public pressure or enlightened leadership. In the second phase the state assumed programmatic responsibility or "buying" change in the provision of services for students with disabilities. During this period, state legislators responded to parents, advocacy groups, and court decisions by passing laws that mandated or fiscally assisted various categories of disabilities; however, some students with disabilities still were not provided educational services. Weintraub describes an evolutionary process into the third phase of facilitator role in state special education finance policy. In this third phase the emphasis changed from providing services along program lines to assisting local schools in delivering an appropriate education to all students with disabilities (Weintraub & Higgins, 1980).

Around the turn of the century, the existing special education programs served only the more severely handicapped in institutional settings. Persons with severe handicaps often involving sensory impairments were, most often, wards of the state placed in state mental institutions, state schools for the blind and deaf, and schools for incorrigibles (McClure, 1975). Early special education programs sponsored by a small portion of public

schools were usually self-contained classrooms in special schools designed for mentally retarded, physically disabled, or emotionally disturbed children.

Mechanisms for funding school finance systems for both general and special education were developing in the early part of this century, mostly as a result of increased demands placed upon the public education system. These early public school programs for special education, however, had no consistent financial support. Special education teachers were frequently given additional salary as an incentive to work with handicapped students. This differentiated salary plus the small class size and categorical programming eventually led to the realization that education for the handicapped cost more than education for the nonhandicapped. States began to provide some categorical assistance to make up for this additional cost. Regardless of how these programs were financed among the states, the funds became known as categorical state aid (Young, 1987).

During these early years of special education finance, states did not have methods of documenting the true cost of special education. There were no measures developed to test the adequacy of funds or the equity of the procedures used to distribute the funds to school districts. The funds were viewed as supplemental appropriations which were designed to reduce the hardship in school districts where there was either a low local tax base, a high prevalence of students with disabilities, or both (McClure, 1975).

The first special education law was passed in Iowa in 1945. Prior to 1945, some funding for special education students in institutions, residential schools, and self-contained classes in larger school districts was provided by a mixture of state and local tax dollars as well as private funds. From 1945 through 1975, special education programs in Iowa were funded by a combination of fixed dollar appropriations from the legislature plus local and county taxes. The appropriations from the state legislature were designed to pay the "excess cost" of special education. The funds appropriated, however, were rarely

sufficient to pay all of the additional costs; hence monies were pro-rated among the school districts and counties that were providing special education programs. School districts could provide for the needs of special education students but were not obligated to do so (Howe, 1978).

Legal requirements defining equity of funding for special education

The state's role in special education was broadened considerably in the 1970s through a series of judicial decisions which established and defined the right to an appropriate education for children with disabilities. Two of the most important cases were Pennsylvania Association for Retarded Children (PARC) v. Commonwealth of Pennsylvania (1972) and Mills v. Board of the District of Columbia (1972). These cases established the obligation of the defendant state and local educational agencies to provide the plaintiffs in the case with a public school education that was suited to each disabled child's needs as well as the procedural rights to due process in matters of hearing and review. Lack of funds was no excuse for denying education to the handicapped. In the Mills decision, the trial judge stated: "If sufficient funds are not available to finance all of the services and programs that are needed and desirable in the system then the available funds must be expended equitably in such a manner that no child is entirely excluded from a publicly supported education consistent with his needs and ability to benefit there from" (Mills v. Board of the District of Columbia, 1972).

The Superior Court of New Jersey in Robinson v. Cahill (1972) indicated that differing needs of pupils dictated that different amounts of money be spent on each student in the state. This case is important because it recognized two important concepts: (a) each student should have equal access to the wealth of the state and (b) equal access to an education based upon differing needs. Robinson established that any school system,

regardless of size, population, or wealth, should provide each child with equal access to an education commensurate with the child's needs. The three prevalent themes in these and other special education litigation focusing on school finance were equal access to wealth, equal access to educational programs, and recognition of varying educational needs (McQuain, 1984).

The right of students with disabilities to appropriate educational services as established through court decisions was followed by federal and state statutes to implement mandated services. At the national level, The Education for All Handicapped Children Act of 1975, Public Law 94-142, granted all school age handicapped children the right to a free and appropriate public education. In addition, the federal law incorporated the language of earlier judicial decisions by adding the concepts of due process and equal access to education for handicapped children. Amendments made to the original legislation in 1991 changed the title of the law to the Individuals with Disabilities Education Act.

Iowa's special education funding system

In response to court precedents and in anticipation of the federal legislation, the Iowa Legislature passed Senate File 1163 in 1974. This law required that an appropriate education be provided to all handicapped children in Iowa between the ages of 0 and 21. Terms of this legislation divided the responsibility for the provision of these services between local school districts and 15 intermediate educational units, referred to as Area Education Agencies, or AEAs. Local school districts were charged with the provision of appropriate instructional programs for students requiring special education. The AEAs were to supply the support services for special education which included special education directors, coordinators, consultants, school social workers, school psychologists, speech

and language pathologists, occupational therapists, physical therapists, and itinerant teachers.

Two different mechanisms were developed to provide funding for each of the two types of services: support and instruction. Special education instructional programs have been funded through the mechanism known as the "Weighting Plan" (as set forth in Iowa Code, Chapter 281, "Education of Children Requiring Special Education," 1975). A weighted index system of funding was established based on the numbers of pupils identified handicapped with a weight being assigned each according to the modifications necessary to meet their educational needs. These weights have been adjusted periodically by the state to account for variations in the costs of providing programs. In 1991 the weightings were: (a) 1.0 for students attending regular class only, (b)1.68 for students attending regular class for the majority of the day but requiring special adaptations or services, (c) 2.35 for students requiring special adaptations or services for the majority of the day, and (d) 3.57 for students who are severely disabled or who have multiple handicaps.

The ratios of students to teachers, and the associated costs, are adjusted in the weighting plan to ensure than an appropriate education can be provided regardless of the severity or complexity of the disability. For example, the pupil-teacher ratio in 1.68 weighted programs is 18 to 1 with an additional appropriation to general education of approximately $2400. In contrast, the pupil-teacher ratio in a 3.52 weighted program is 5 to 1 with at least one teacher aide. This weighting generates an additional dollar amount of approximately $8750.

Provisions set forth in Iowa Code, Chapter 273, "Area Education Agency" (1975), established special education divisions in each of the 15 area education agencies to provide special education support services. These services, though provided by AEAs, are funded

through local school district budgets. Each AEA has been assigned a cost per pupil for special education support services. These costs per pupil ranged among the 15 AEAs from approximately $117 to $138 in the 1990-91 school year. The assigned dollar amount per pupil is multiplied by a school district's weighted count, which includes an actual count of all pupils as well as the additional weights applied to special education students as described in the "Weighting Plan." These funds are generated within local school district budgets, but are paid directly from the state to the area education agency.

The area education agency conducts a count of the number of pupils in each instructional and disability category within each school district on December 1 of each school year. This child count is then certified by the AEA Director of Special Education to the Department of Education. The reported number of pupils in each instructional category is multiplied by the appropriate weighting to determine the weighted enrollment. The Department of Education uses these calculations to generate funds for special education programs as part of the School Foundation Aid Plan for the following school year.

Trends in Special Education Population

There has been a dramatic increase in the numbers of students served in special education programs since the original state and federal laws were enacted in 1974 and 1975 respectively. Nationally, the numbers of students in special education increased approximately 25% from the 1976-77 to the 1988-89 school year. While nationally approximately 6.7% of students 3 to 21 are served in special education, these percentages vary greatly from state to state. For the school year 1988-89, Iowa was reported as being 13th from the highest in the ranking of states in terms of percentages of students served in special education (Twelfth Annual Report to Congress on the Implementation of the Education of the Handicapped Act, 1990).

Further comparisons can be made between Iowa and other states regarding the numbers of children served in special education. For educational purposes, Iowa is often compared to the group of midwestern states shown in Table 1. The numbers used include those children ages 6 through 17 receiving services under the Individuals with Disabilities Education Act. The number of students receiving services as "speech impaired" has been subtracted from the state total in each instance because in Iowa the cost of speech-language services are not paid from weighted instructional dollars. Numbers of students served ages 0 to 6 and beyond 17 have also been omitted from these comparisons because states differ in their mandates to serve these populations.

Table 1. Comparison by State of Pupils Served Under EHA, Part B[a]

State	Total Population of Children Ages 6–16	Total Population of Handicapped Children Ages 6-17	% of Total Population
Minnesota	722,000	56,448	7.82%
Iowa	**494,000**	**38,393**	**7.77%**
Missouri	865,000	63,307	7.32%
Nebraska	276,000	19,016	6.89%
Illinois	1,999,000	126,814	6.34%
Kansas	419,000	26,380	6.30%
South Dakota	126,000	7,705	6.12%
Wisconsin	841,000	50,008	5.95%
North Dakota	120,000	6,977	5.81%

[a] (Data from 11th Annual Report to Congress, U.S. Department of Education, 1989 Data as of October 1, 1988).

There are also differences among states in the use of specific disability labels for students. Nationally, approximately 7% of students are in special education with the following categorical distribution: (a) 48% are learning disabled, (b) 23% are speech or language impaired, (c) 14% are mentally disabled, (d) 9% are emotionally disturbed, and (e) all other disabilities account for the remaining 6%. By contrast, in Connecticut, nearly 19% of students enrolled in special education are labeled emotionally disturbed, and in Idaho, fewer than 3% are placed in that category. Iowa categorizes 42% of students in special education as learning disabled, 20% as speech or language impaired, 20% as mentally disabled, 12% as emotionally disturbed, and 6% as other disabilities (Twelfth Annual Report to Congress on the Implementation of the Education of the Handicapped Act, 1990).

Since the Iowa "Weighting Plan" was implemented in Iowa in 1975, there has been a steady increase in the percentage of children identified as requiring special education. As Table 2 indicates, in all but two years since the beginning of this funding plan, special education enrollments have increased. The percentage of Iowa students, ages 0 to 21, requiring special education has expanded from 5.40% to 9.08% of the total school enrollment.

Because school districts in Iowa generate money for special education services proportionate to the numbers of students they identify, the increases in pupil identification translate directly into the amount of state reimbursement to the district, the proportion of the total budget devoted to special education and, in recent years, the amount of money that must be allocated locally to cover shortfalls in state reimbursement. Funds generated through the state's special education finance plan for the past three years have been insufficient to cover the costs of special education services. Approximately three-fourths of all school districts currently report deficits in their balance of funds for special education at

the close of the school year. The total amount of the deficit statewide has varied between $11 million and $13 million dollars each year, or approximately 5% of the funds required for special education instructional programs. This deficit represents dollars already expended from the district's general fund. Districts must either generate additional funds through a local property tax levy or use unexpended cash in their general fund to pay for costs of special education not included in the finance formula.

Table 2. Certified Enrollment and Special Education Enrollments from 1975-1989

Year	Certified Enrollment	% Change	Special Ed. Enrollment	% Change	% of Total Enrollment	Change
1975-76	613729.6		33140		5.40%	
1976-77	606305.9	-1.21%	33649	1.54%	5.55%	0.15%
1977-78	590074.9	-2.68%	36672	8.98%	6.21%	0.66%
1978-79	569404.5	-3.50%	38376	4.65%	6.74%	0.52%
1979-80	549686.2	-3.46%	40257	4.90%	7.32%	0.58%
1980-81	535436.8	-2.59%	43647	8.42%	8.15%	0.83%
1981-82	518522.5	-3.16%	40198	-7.90%	7.75%	-0.40%
1982-83	505121.2	-2.58%	40070	-0.32%	7.93%	0.18%
1983-84	497210.3	-1.57%	40996	2.31%	8.25%	0.31%
1984-85	490602.6	-1.33%	42273	3.11%	8.62%	0.37%
1985-86	485195.8	-1.10%	41892	-0.90%	8.63%	0.02%
1986-87	480843.0	-0.90%	42360	1.12%	8.81%	0.18%
1987-88	478988.7	-0.39%	42625	0.63%	8.90%	0.09%
1988-89	476941.7	-0.43%	43290	1.56%	9.08%	0.18%

Increased demands for special education services while fiscal resources are diminishing have led to renewed concern in Iowa and nationally about the effectiveness of the current procedures for funding special education. As early as 1983, Hartman (Chambers & Hartman, 1983) predicted that new and growing levels of special education funding would attract greater attention from policy makers concerned with containing costs. He stated that the days of spending "whatever it costs" for special education programs might end.

Special Education Finance Equity Issues

Increasing numbers of special education students and the escalating costs of special education services have led to concerns about how to equitably distribute the funds which states have available for special education. There are two broad types of equity that school finance systems generally promote. These are: (a) equity of educational opportunity for children and (b) equity of tax burden for taxpayers. Concerns about each have been central to the study of school finance for over a hundred years. Paul Mort, a professor at Columbia University in the 1930s, was the first to address the cost differentials in providing different types of programs to special needs students, or the concept of the weighted pupil. Since then, weighted formulae have been studied more than any other type of special education finance procedure. Weighted formulae, such as the Iowa weighting plan, address student needs, program costs, and allow for population differences among school districts (Moore, Walker, & Holland, 1982).

National literature on special education finance

In 1975, Alexander (in Rehmann & Riggen, 1975) addressed the issue of individual student needs and the impact on school finance plans. He said that school

finance in general had developed slowly and haphazardly because of a lack of in-depth study of issues. He noted that equalization of educational opportunity required two elements: (a) identification and funding appropriate programs for specific groups of students with specific needs and (b) distribution of funds on the basis of the ability of the district or state to support the programs. Alexander concluded by saying that "The basic purpose of all educational fiscal policy should be to put the money where the need is and if this is adequately done, equalization of educational opportunity will be in large part accomplished" (Rehmann & Riggen, 1975, p. 219).

Rossmiller and Frohreich (1979) identified the "dimensions of need" for special education programs and surveyed procedures for funding special education programs for students with disabilities. They reported that the absence of common definitions across states and communities and the lack of a nationwide census of special education students were major barriers in estimating costs for special education. Local districts were found to be carrying the major burden for financing special education programs. In a study conducted for the Idaho State Department of Education, it was noted that many states had made changes in their general school finance formulae to relieve local property tax burden and promote greater equality in educational opportunity. However, states had paid far greater attention to the revenue side of the equation and much less to the allocation side, or the issue of equitable distribution of funds. Many state legislators had come to view equal spending per pupil as synonymous with equal opportunity. It was suggested that state finance models would have to take into account such things as socioeconomic conditions and prevalence of handicapped populations in order to assure equitable distribution of funds. A weighted pupil count was promoted as a means of addressing these needs (Rossmiller & Frohreich, 1979).

The evolution of educational equity in the United States was traced by Weintraub, Abeson, and Braddock, in 1971. Equal educational opportunity means that both the costs and benefits of education must be fairly distributed. They concluded their research by noting that the concept of equity had changed from one of identical inputs to a concept in which students with differing needs receive different inputs in order to achieve common goals. This concept of equity requires varying allocations of monies depending on differences in students' needs (Weintraub et al., 1971).

Bernstein, Kirst, Hartman, and Marshall (1976) conducted a major study on the financing of programs for special education. Their report focused mainly on issues related to state level policy. The four major areas of focus were: (a) programming, (b) cost determination, (c) level of funding, and (d) funding formulae. Programming was the major issue since resolution of the other three issues should follow programming decisions. Bernstein et al. searched the available literature and surveyed all states to describe current funding procedures in special education. Among other findings, program variations occurred because of geography, wealth of the district, and court ordered services, as well as severity of handicapping conditions. The absence of a standard definition of a target population was viewed as being the greatest impediment in determining total special education needs and costs. Recommendations for further research included: (a) determining how many children require special education, (b) deciding what proportion of children can be effectively served in various program models, and (c) judging what program alternatives are most effective (Bernstein et al., 1976).

Another review of literature to identify major issues relative to costs and funding of special education programs was conducted by Kakalik (1978). Kakalik commented upon the latitude of definitions and services for students with disabilities across different geographic areas. The definitions of handicapping conditions varied to the extent that a

child found to be disabled in one community would not be so identified in another. Further, the definitions of required services to accommodate a certain disability appeared to change across regions and over time. Kakalik went on to predict that there would not be money to meet all of the service needs of every child diagnosed as having a disability, thereby drawing a direct connection between issues in classification of students with disabilities and finance issues. He cited four ways in which the determination of who is disabled is related to finance: (a) a definition of who is to be served affects the total amount of dollars available for special education; (b) a definition conveys to policy makers at all levels what the needs are for the population served; (c) a definition affects the ability to target funds and fiscal accountability; and (d) a definition may enable funds to be allocated in varying amounts depending on the cost involved in programming for an individual child (Kakalik, 1978).

McCarthy and Sage (1982) concluded that systems to fund special education programs have always been intended to incorporate the need for service, a fair way of procuring the necessary resources, and an acceptable method for distributing them. They indicated, however, that the notion of "acceptable" has conflicting interpretations. There is the political reality of resource distribution as opposed to the idealistic notion of distributing resources on the basis of some notion of equity. Value judgments drive the distribution of resources for special education. They cited a need for flexibility in programming which will occur "only when decisions are not dependent on fiscal influences and appropriate resources are provided for each child's unique or unequal needs. We must approximate fiscal neutrality in order to achieve true equity" (p. 415).

Special education funding formulae were analyzed by Hartman (1980) with the conclusion that they could be grouped by the main factor used to determine allocation of funds. All formulae use either resources required, children served, or program costs as the

basis for distributing funds. He suggested that the main issue was to keep the funding formula neutral so that there was neither overclassification to gain additional dollars nor underclassification due to insufficient reimbursement. In his opinion, child-based formulae (such as the weighted pupil count used in Iowa) are most likely to encourage overclassification of children and more often result in programs being provided in isolated settings, as opposed to the regular classroom (Hartman, 1980).

It was concluded in a study by Leppert and Routh (1979) that in states where a weighted pupil index was the basis for funding (e.g., Iowa), special education programs generally expanded. It would follow that putting a limit on the numbers of students to be funded by the state would limit the continued growth of special education programs. However, as Hartman (1980) pointed out, a funding formula in and of itself will not control special education cost. He suggested that the formula is only a mechanism for transferring monies from one governmental level to another. Regardless of money available, school districts are required to provide necessary services to students identified as being in need of special education.

In his review of special education finance literature, Crowner (1985) described the 1980s as the period in which the central issue changed from whether society should serve the needs of special education students in public schools to the issue of whether the current methods of fiscal support for these programs are effective and efficient. He listed four questions which need to be answered in order to address this problem: (a) Who are the handicapped? (b) Is the rapid growth of services for the mildly handicapped cause for concern? (c) Should fiscal support for the handicapped occur at the expense of other needy students? and (d) What is the best way to pay for these services? (Crowner, 1985).

Iowa finance research

As early as 1978 there was concern among policy makers about the future ability of the state to fund the rising costs of special education. At the request of the legislature, a study was published which predicted costs for special education in the state of Iowa from 1975 to 1985 (Howe, 1978). The study found that approximately 6% of Iowa's public school enrollment was included in special education programs in 1975. Howe anticipated that this number would peak at about 9% by 1982. Following 1982, the actual numbers of special education students in Iowa was predicted to decline along with the decline in the general school enrollment. For this to happen, Howe warned that the Department of Public Instruction and the AEA Directors of Special Education would need to closely monitor newly identified special education students. The report went on to suggest that if the numbers did not begin to decline following a peak in the early 1980s, the Iowa Legislature might consider placing a ceiling on the percentage of students who could be funded as mildly handicapped.

In the 1980s, two additional studies of Iowa's special education finance system were conducted. Both concluded that there was a need for further study of the issues surrounding the funding of special education programs in Iowa to assure equity in the provision of services (Bradley, 1982; Burgett, 1985). Equity, from their perspective, implied that handicapped children with similar needs in different districts receive the same opportunity for an appropriate education based upon individual needs.

Burgett (1985) traced the rapid increase in numbers of students served in special education programs and the cost of those programs over the 10 year period from 1975 to 1985. He concluded that it was likely that some overidentification of special education students had occurred. Because the funding level for special education programs is basically determined by the number of students identified, school districts were seen as

having an incentive to identify more students in order to fill special education class rosters. He called for reassessment of the entire special education delivery system, including the funding component. Burgett concluded by recommending further study of the identification, weighting, and placement procedures for special education students. He suggested that any significant differences found among the area education agencies in the proportion of students served in special education programs should be investigated. The results of such a study would lead, in his opinion, to a more cost effective funding mechanism (Burgett, 1985).

In an earlier study, Bradley (1982) found that the area education agencies with the greatest percentage of handicapped students served in resource rooms also had the greatest per student assessed property valuation. She concluded that "the interactions of wealth, achievement, and the number and severity of handicapped students needs further study" (Bradley, p. 154). She suggested that additional investigation was needed in order to detect patterns in the identification, weighting, and placement of special education students between geographic and administrative regions of the state as defined by area education agencies.

In 1991, the Iowa Department of Education submitted recommendations for changes in special education funding based upon the work of a task force. The task force recommendations would place a limit, based upon a percentage of the district's general enrollment, on the amount of funds a school district would receive from the state aid formula for providing special education programs for students with mild and moderate disabilities. The 28 school districts whose special education identification rates exceeded that which was defined as allowable within the formula would be required to fund their additional costs from local property tax. School districts that received funding which was based on a special education pupil count below the state average could increase their pupil

count and therefore their spending by 0.5% per year until they reached the average. Funding for students with severe disabilities would continue to be based upon individual pupil identification with no limits placed upon numbers funded in a school district (Report of the Special Education Task Force, 1991). Because this plan would limit funds for special education and redistribute available dollars among school districts based upon average incidence levels, these recommendations have proven controversial among educators and policy makers. There is currently no evidence to support either the unlimited growth, and therefore unlimited spending, for special education proposed by some or the controlled spending based upon average incidence levels recommended in the task force report.

Special education finance has become a concern of state policy makers only within the last 15 years, following the federal and state mandates to serve all students with disabilities. Therefore, the body of research is relatively small. In all of the studies reviewed, the issue of equitable allocation of resources for special education has been a primary focus. It is generally agreed that equity in special education funding does not imply the equal distribution of dollars among all students, nor the equal distribution of dollars across all school districts. Methods for generating and distributing dollars for special education programs as part of a state's school finance plan have been developed over the past 15 years. Remaining unanswered is the basic question of how to develop a standard by which policy makers may determine the equitable distribution of finite dollars for special education. Previous studies have pointed to a need to look at the variables involved in the identification of students with disabilities and how these variables might be addressed in the equitable distribution of resources for special education.

Demographic and Socioeconomic Variables Related to Achievement

Previous research has explored achievement, demographic, and socioeconomic factors which relate to the proportion of students served in special education. A number of studies of the relationships among economic and demographic variables to the achievement levels of students have been published. The relationship between family background and student achievement has been documented by many authors (e.g., Coleman et al., 1966; Blau & Duncan, 1967; Mosteller & Moynihan, 1972; Jencks et al., 1972); lower socioeconomic status is systematically related to lower achievement. Studies of the relationships between community social status characteristics and school academic achievement measures have resulted in findings of squared multiple correlations varying between .5 and .85 (Hogan, 1970). Less research has been published regarding the relationships of demographic, achievement, and socioeconomic variables to the prevalence of students with disabilities. (Note, prevalence refers to the proportion of students with disabilities at a specific time.)

Gilbert (1968) used a stepwise regression analysis in developing a procedure to predict pupil achievement in a school district on the basis of community characteristics. He collected data from 36 school districts in Los Angeles County, California, on school financial factors, socioeconomic data and school achievement test scores. The stepwise regression analysis yielded a .93 correlation with achievement. Factors in order of influence were overcrowded housing, adult educational level, training and experience of the teacher, percentage of working married women with children under age six, total school tax rate, and the pay scale of the teachers. Gilbert recommended that school districts use the regression analysis to evaluate their program by comparing the actual achievement of students with their expected achievement (Gilbert, 1968).

Hogan (1970) studied the relationships between 23 socioeconomic status variables and achievement (Stanford Achievement Test and the Metropolitan Achievement Test). The amount of schooling and the income of adults in the community were found to be the best predictors of achievement performance.

Achievement prediction models were developed by Hybertson (1974) in order to identify factors that affected achievement for a group of 824 black and white third graders. Potential predictors studied were ethnicity, socioeconomic status, occupation, educational level, income, family structure variables, home environment, and self-concept. Data were collected using parent interviews, the Coopersmith Self-Esteem Inventory, the Intellectual Achievement Responsibility Scale, and the Metropolitan Achievement Test. Results indicated that ethnicity was the most significant predictor of achievement. None of the socioeconomic measures proved to be significant predictors of achievement (Hybertson, 1974). In interpreting the results of this study, it should be acknowledged that ethnicity was, most likely, highly correlated with nearly all of the other variables.

Ramey, Steadman, Patterson, Mengel, and Wood (1976) used birth certificates to predict the social and educational status of children when they reached school age. Birth certificates were located for 966 of 1,000 randomly chosen first grade students in North Carolina. Student achievement was measured by the Peabody Picture Vocabulary Test, the Tests of Basic Experiences, the Berry-Buktencia Developmental Test of Visual-Motor Integration, and the Myklebust Pupil Rating Scale. Multiple regression analyses were performed to predict a student's intelligence, academic achievement and teacher ratings on the Myklebust Scale, based upon the information available on the birth certificate. Race and education of the mother together accounted for 27% of the variance on intelligence. Race, education of the mother, and the child's prior educational experience in combination accounted for 33% of the variance on academic achievement and 33% of the variance in

ratings assigned by teachers. These variables of family background, related to the overall socioeconomic status of the family, were viewed as significant contributors to the academic achievement of students when they reached school age.

The relationship between seven student background variables and achievement test performance was investigated in a sample consisting of 876 fourth grade pupils, 60% of whom were black, from 11 school districts in a southeastern metropolitan city (May, Alexander & Holcomb, 1978). The variables used to predict achievement (Comprehensive Test of Basic Skills) were number of rooms in the dwelling, number of persons in the dwelling, number of cars in operation by dwelling residents, existence of air conditioning in the dwelling, number of children in the neighborhood attending private school, kindergarten attendance, and sex of the student. The first five of these were considered economic variables. The researchers created a new variable called Econ by adding points associated with each of the five economic variables and then dividing the sample into three groups made up of high, middle, and low scores on the Econ variable. Findings revealed significant differences among the three groups in terms of academic achievement, with higher scores on the Econ variable correlating to higher academic achievement.

Levine et al. (1979) reviewed the relationship between concentrated poverty and reading achievement at the elementary level in seven urban cities: Chicago, Cleveland, Cincinnati, Houston, Kansas City, Los Angeles, and St. Louis. Neighborhood characteristics of poverty identified were single female parent, housing units valued under $15,000 and under $20,000, percentage of service or unskilled workers, percentage who had moved in the past year, assaults per population, percentage of dangerous buildings, and population density. The results in all seven cities pointed to the conclusion that concentrations of poverty and related characteristics are associated with low student achievement in school (Levine et al., 1979).

In a study of reading achievement in Chicago schools, Frederick (1979) used regression and factor analysis to determine which school factors were associated with the reading comprehension scores of students ages 7, 10 and 13. Reading comprehension was a three year average of scores obtained on the reading subtest of the Iowa Tests of Basic Skills. Factors found to relate most closely to reading comprehension were school attendance, amount of money spent per pupil, the smaller size of the school, and the educational attainment of the teacher. Poverty was the strongest indicator of reading achievement in the primary grades, with reading achievement highest where there was the least poverty. The second greatest predictor of reading achievement in primary grades was the percentage of whites in a school. The highest predictor of achievement gains in the intermediate and upper grades was the achievement level score obtained at age 10 (Frederick, 1979).

A longitudinal study of reading achievement reinforced the relationship between reading achievement and socioeconomic background. Students were divided into high, average, and low achievement groups according to scores on the Stanford Achievement Reading Comprehension Test. Progress in reading was measured over a three year period. Participation in the district's free lunch program was used as the basis for sorting subjects into economically advantaged and disadvantaged. It was found that, as a group, economically advantaged students outperformed economically disadvantaged in all three achievement groups (Avalos, 1986).

The studies relating demographic and socioeconomic factors to achievement are important to a study of proportions of students served in special education. In order to meet eligibility requirements for special education programs, it must be demonstrated that a student both has a disability and is in need of special education. Achievement tests are commonly used assessment procedures to establish a student's need for special education

(Reschly, 1988a). It would follow that school districts with larger proportions of low achieving students would have more referrals for special education services and therefore the potential for more students to be placed in those programs.

Studies Relating Demographic and Socioeconomic Factors to Proportion of Students with Disabilities

Previous studies have used a variety of methods to measure demographic and socioeconomic factors which relate to proportions of students with disabilities. Demographic factors have included variables of district size, population density, education level, and pupil-teacher ratios. Income level, property values, and numbers of students receiving free and reduced lunches are variables which have been used to assess socioeconomic conditions relating to proportions of students with disabilities.

District size and population density

School district size has often been cited as a factor related to the proportion of students with disabilities who are served in special education programs. The special education population has been described as skewed, with far greater percentages living in large urban areas. A variety of reasons have been offered to explain the higher urban proportions. One possible reason is that fewer specialized services are available in rural areas. Therefore, these families with special needs children may relocate to or stay in urban areas (Marinelli, 1976). No data are available to substantiate this hypothesis.

Some empirical studies of district size have been published. District size was found to be related to the numbers of students served in special education in a study of the weighted pupil funding systems in the states of Florida, Utah, and New Mexico (Leppert & Routh, 1980). One of their findings was that changing to a pupil driven finance system

resulted in a proportionately larger increase in numbers of students being served in special education programs in the nine school districts in Florida with student populations of over 50,000 than in smaller Florida school districts. These results were explained by assuming that dollars follow need in a pupil weighting system. They hypothesized that the differences in the proportions between the larger and smaller districts were due to: (a) larger districts have greater concentrations of poverty and therefore greater need for special education; (b) parents of children with disabilities tend to move to urban areas where there are more special education and social services; (c) large school districts were the pioneers in offering services to students with disabilities and therefore have a reputation which attracts more students; and (d) larger school districts usually have better organized advocacy groups that can work to expand certain programs such as those for children with learning disabilities (Leppert & Routh, 1980).

McCarthy and Sage (1982) also reported more special education services in densely populated urban areas. They attempted to determine the factors that should be addressed in developing a state special education finance plan through a study of the views of 19 experts in educational policy. Results of the structured interviews produced a list of validated policy considerations regarding new or existing state special education finance legislation. A major conclusion was that finance plans should be responsive to geographical population differences. Specifically, they suggested that since densely populated urban areas would be expected to have a disproportionate number of special education students, consideration should be given to using an "urban multiplier" in any special education finance formula (McCarthy & Sage, 1982).

Chalfant (1967) found population density to be the best predictor of special education services. His study identified four special education services: (a) speech-language therapy, (b) deaf education, (c) education for mentally disabled, and (d) the

presence of a special education director. Thirty-one economic and demographic variables were reduced to six through a factor analysis procedure. The six factors which remained were: (a) population density, (b) education level, (c) socioeconomic status, (d) occupations, (e) financial ability, and (f) population growth. A multiple regression analysis was used to test the strength of each of the variables in predicting the proportion of children receiving the services chosen in the sample. A dense population was found to be the best predictor of the proportion of students served in special education, followed by high education level of the citizens and high socioeconomic status of the school district. It is important to note that the Chalfant study was conducted prior to state and federal mandates when, typically, school districts had wide discretion regarding provision of services to students with disabilities.

All of these studies conducted between the 1960s and the early 1980s point towards the conclusion that large, urban school districts serve a higher proportion of students in special education classes. The opposite was true, however, in a 1986 study of 200 randomly selected Texas school districts where smaller, rural school districts were found to serve a higher proportion of special education students (Cykala & Greer, 1986). A possible explanation for these discrepant findings might be that earlier differences in the magnitude of programs and services for special education students among rural and urban centers have diminished in recent years.

Education level

Patrick and Reschly (1982) studied the prevalence of mental retardation among the 50 states. The strongest predictor of mental retardation prevalence in a state was the educational level of the population, as measured by the median number of school years completed by persons 18 years and over. Educational level accounted for 62% of the

variance in the prevalence of mental retardation. Those states with the highest mean education level were the states with the lowest prevalence of mental retardation. Patrick and Reschly interpreted educational level as a strong influence on the prevalence of mild, but not severe, mental retardation.

The education level of parents is related to the likelihood that a child will be identified by teachers as needing special education. Among a group of 12- to 16-year-olds, teachers identified 24% of those students whose parents had not completed high school as being incapable of doing grade level work. Only 4% of the children of college graduates were judged by these same teachers as being academically deficient (Zill, 1985).

Education level has been found in previous research to relate to the prevalence of disabilities, the numbers of referrals to special education, and the general achievement level of students.

Pupil-teacher ratio

There has been much debate concerning the relationship between pupil-teacher ratios and the achievement of students. After conducting meta-analysis of previous class size research, Glass and Smith (1978) concluded that there was a clear and strong relationship between class size and achievement. A later summary of issues related to class size (Robinson & Wittebols, 1986) reported evidence that small class size results in increased reading and mathematics achievement as well as improved pupil behavior and attitude for elementary age students. Further, small classes were found to positively affect the academic achievement of economically disadvantaged and ethnic minority students.

No studies were located which analyzed the specific relationship of pupil-teacher ratio to proportions of students with disabilities. It has been hypothesized, however, that teachers with more students in a classroom are more likely to refer students to special

education (Latham, 1987). Latham cited pupil-teacher ratios as being one of the major disincentives for teachers to accept the responsibility of difficult to teach children. Special education classes are viewed by both teachers and administrators as a means to relieve overburdened classroom teachers of their problem students.

Socioeconomic factors

Studies relating socioeconomic measures to the proportion of students served in special education classes have produced mixed results. An early study by Wilken and Porter (1976) examined the development of special education programs in two very different states, Massachusetts and Georgia. They found three common characteristics of school districts that served the greatest numbers of students in special education: (a) active community involvement in school policies, (b) school staffs that were large, specialized, and well led, and (c) moderate to high personal income levels and high taxable property values. Since this study was conducted just a year after services to special education students were federally mandated, the results might be explained in that wealthier school districts with high community participation would be leaders in providing services that were just being recognized as a state responsibility.

Nelson (1983) investigated the variability in the special education proportions and the cost of those services in the state of Wisconsin. Those school districts with high poverty levels were found to serve low proportions of special education students. Some of the socioeconomic variables, however, were not related to special education proportions. Unemployment rates, percentage of persons over age 65, and percentage of minority population were not significantly related to prevalence. While the expectation in a socioeconomic model is that poverty contributes to higher prevalence, Nelson cited fiscal constraints as dominating the realities of educational need in poor school districts. He

hypothesized that in wealthy school districts there would be greater demand for high quality education services, including special education services. Also, wealthier districts could more easily contribute the 30% local share of each dollar generated for special education in Wisconsin. He concluded that school district officials in Wisconsin exercise much control over identification policies because they can hire diagnostic personnel whose training and opinions are consistent with the school district's financial situation.

Surveys conducted under the auspices of the National Institute of Education concluded that neither poverty nor urbanicity influenced the typical proportion of students enrolled in special education programs for mildly handicapped. This conclusion was based upon data gathered on programs for mildly handicapped students through both surveys of school principals and teachers of mildly handicapped, as well as case study interviews in school districts and states (Moore & Steele, 1988).

Other studies have found that low socioeconomic status is related to a higher number of students requiring special education. Rossmiller cited a study done by the California Commission on Mental Retardation in 1965 which found that the higher the socioeconomic level, the lower the prevalence of retardation at each of the elementary, junior high, and senior high schools surveyed (Rossmiller, 1969). Patrick and Reschly (1982), in their study of prevalence rates of mental retardation among the 50 states, found a significant correlation between the per capita income of a state and the percentage of students being served in programs for mentally retarded. It should be noted that these studies relate to the prevalence of mental retardation, not to the overall proportion of students with disabilities.

Data from the 1981 National Survey of Children found a strong association between income level of parents and the need for special education. The survey found that 35% of sampled school children in families with an income of less than $10,000 needed

remedial reading, as compared to 12.3% of students with family incomes of $20,000 - $35,000. This same study indicated that in families with incomes of less than $10,000, 16.7% were judged to be slow learners or learning disabled compared with 7.4% in the upper income group. Further, among the group with incomes of less than $10,000, 8% were identified by teachers as being emotionally disturbed, compared with only 1% of students from families with incomes of over $35,000 (Zill, 1985).

Percentage of students receiving free lunch was used as one of the variables in a study conducted in Mississippi to examine the relationship of socioeconomic factors to the proportion of students served in special education and the label given these students. The five variables used in the study were: (a) percentage of students identified as educable mentally retarded, (b) percentage of students identified as learning disabled, (c) district percentage of students receiving free lunch, (d) percentage of district budget from local sources, and (e) percentage of nonwhite students. Little variance was found among school districts in the total proportion of special education students served. This fact was attributed to the system of financing special education in Mississippi which provided for funding based upon a percentage of school district enrollment. Significant differences in the prevalence of mental retardation and learning disabilities were reported. School districts with high prevalence rates of mental retardation had higher numbers of students receiving free lunch and higher numbers of nonwhite students. By contrast, districts with a high prevalence rate of learning disabilities had lower numbers of students receiving free lunch and fewer nonwhite students. They viewed socioeconomic status as being a significant factor in the determination of the category of special education in which a student is placed (Schwenn et al., 1989).

Noel and Fuller (1985) analyzed the percentage of learning disabled students identified in each of the 50 states and the change in that percentage from 1976 to 1982.

They discovered that the number of children living in poverty was the single most significant variable in predicting the increase of students labeled learning disabled. The authors explained the results by citing the significant decrease in federal funds targeted for low income educationally disadvantaged, especially in large urban areas, from 1976 to 1982. Faced with dwindling resources in programs such as Chapter 1 for compensatory education, special education became a means to serve the needs of a higher proportion of low achieving students. Because there are long-standing issues regarding the lack of a clear definition and criteria for identifying students as learning disabled, these generally low achieving students who presented achievement or behavior problems in school were labeled learning disabled and became part of the special education population.

Variation in placement among special education students was attributed to socioeconomic factors in a study of special education programs in five urban school districts. It was found that among learning disabled and physically/multiply disabled students, higher socioeconomic status was associated with a greater proportion of time spent in regular class. The researchers hypothesized that affluent, better educated parents were stronger, more vocal advocates of education in the mainstream, and thus were better able to ensure those placements for their children (Singer, Butler, Palfrey, & Walker, 1986). They concluded that special education services differed depending upon the district where the child happened to live and the individual circumstance of the child's family (Singer & Butler, 1987).

Social construct theory of disability

The relationship among total numbers of special education students and the prevalence of certain disabilities has been the subject of some studies. Patrick and Reschly (1982) concluded that there is a large degree of overlap in the labeling and provision of

services to children classified as mildly mentally retarded, learning disabled, and emotionally disturbed. They view the label of mild mental retardation as a relative term best understood from a social system rather than a medical model perspective (Patrick & Reschly, 1982).

Noel and Fuller (1985) reached the conclusion that there are a large number of students who are labeled "handicapped" but who really have a socially constructed "disability." These are children whose only disability is that they stray from the mainstream of what is tolerated or expected in schools. They cite the need for further exploration of the state and local district variables that relate to the patterns of identification of special education students. A logical next step in their view would be to develop state profiles that would predict the "behavior" of special education in the schools. This state data could then be refined by looking at similar variables among school districts (Noel & Fuller, 1985).

The argument has been advanced that there is a difference in the strength of the relationship between socially constructed variables and the prevalence of two general types of disabilities. Gelb and Mizokawa (1986) examined percentages of students placed in what they considered subjective and objective categories of special education and how each related to 13 social demographic variables. These variables were categorized into three areas: ethnicity, social deviance, and socioeconomic status. They suggested that the categories of educable mentally retarded, learning disabled, seriously emotionally disturbed, and gifted were subjective in that criteria for these disabilities are relative and based on psychological or educational constructs. The objective categories included hearing impaired, visually handicapped, orthopedically impaired, and multihandicapped; all of which are based on physical evidence of organic impairment.

Correlations between the 13 social demographic variables and the prevalence of each of the categories of special education students were analyzed. Findings indicated no significant correlations between the variables and what they defined as the objective categories of special education. They did find that the numbers of children identified as educable mentally retarded and learning disabled were significantly associated with social variables. Socioeconomic status was significantly positively correlated with the prevalence of mental retardation and significantly negatively correlated with the prevalence of learning disabilities. This led to a conclusion by the authors that these labels are given to students in the context of social situations within schools and are not biological disorders (Gelb & Mizokawa, 1986).

The ever increasing prevalence of students categorized as having learning disabilities was described as a problem which "undermines our credibility and stretches the patience of policy makers concerned about increasing and seemingly endless financial burdens" (Reschly, 1988, p. 460). The learning disabled population more than doubled in the 10 years following the federal mandate for special education services in 1975. Because there is no way to clearly distinguish between mildly disabled students and nondisabled students who are performing at below average levels, Reschly predicted that this population could double, triple, or quadruple if all low achieving students needing remedial education were classified as learning disabled. Further, little evidence supports the notion that these mildly disabled students require teaching methods or interventions which differ from those of low achieving students in general education. There is no proof that better outcomes are achieved in learning disability programs than in less costly models for serving low achieving students, such as Chapter 1. In Reschly's opinion, monies currently allocated for special education programs for mildly disabled students could be better used to support interventions for this type of student in general education (Reschly, 1988). .

This difficulty in determining what students should be served and how many students should be served in special education was confirmed in another study. The authors relied upon a review of literature, statistical data, and professional experience in making recommendations about future funding for special education (Edgar & Hayden, 1985). In their view, the inexact nature of the identification process for mildly disabled students leads to the conclusion that the only intellectually honest process for funding special education programs is to make flat grants to school districts based upon predicted incidence rates. They propose funding up to 2% of the school population for students with what they term as quantifiable handicaps--those with some organic deficit. An additional 2% of the population could be served in speech programs. A predetermined further percentage of the total school-age population would be defined as low achieving and receive funding accordingly. These students would be divided into two categories: the lower functioning served by special education and the higher functioning receiving additional assistance in regular education. The authors list four advantages to this funding proposal: (a) educators would no longer have to categorize students into nonfunctional categories; (b) it would acknowledge the futility of categories for the mildly disabled; (c) it would be more consistent with the original intent of special education legislation; and (d) regular education would be rightfully assigned the major responsibility for educating mildly disabled students (Edgar & Hayden, 1985).

There is current research to support the concept of two groups of students with disabilities. The organically or sensory impaired group is viewed as being relatively small and stable. The second group of students includes those with mild disabilities, predominantly labeled as behavior disordered, learning disabled, or mild mental disability. The group of students with mild disabilities is characterized by ambiguous definitions and

classification criteria, inconsistency in incidence rates across school districts and states, and uncertainty about the nature and benefits of current special education programs.

Summary of Literature Reviewed

In the past 15 years, school finance experts have focused most of their effort on reforming state school finance formulas so that expenditures per pupil would not be a function of the wealth of the district. This has been done primarily through the distribution of state funds in varying proportions to local school districts so that equal local tax efforts result in equal per pupil expenditures for education. This approach focuses on the revenue dimension of a state finance plan and results in equity for taxpayers. Relatively little attention has been paid to the variations in need across school systems in areas such as special education. The distribution dimension of a state's finance plan must change if these needs are to be considered.

In reviewing special education finance literature, conflicting views have been presented regarding the need to consider demographic, achievement, and socioeconomic factors in decisions about the allocation of dollars for special education. McCarthy and Sage (1982) contended that variations in population density, socioeconomic status, and cultural characteristics create uneven needs for special education services. In another major study of state funding formulae for special education, Chambers and Hartman (1983) concluded that there was no consistent statistical relationship between the proportion of students that states were serving in special education and geographic location, per capita school expenditures, size of the school population, or the percentage of the population residing in rural areas.

Research has identified some potential variations among school districts in their need for special education services based upon demographic, achievement, and

socioeconomic differences. The proportion of students served in special education in Iowa school districts ranges from 3% to over 17%. Whether there are school district differences of sufficient magnitude to justify these wide variations is presently unknown. Prior literature generally supports the existence of several demographic, student, and socioeconomic correlates of disability prevalence. These relationships are not entirely consistent; but increased district size, low education level, low achievement, and low socioeconomic status are usually significantly correlated with disability proportions. The critical issue to be answered in this research is whether these correlates exist in Iowa and, if so, can they explain the wide differences in special education prevalence.

CHAPTER III

METHODS

Purpose of the Study

The purpose of this research was to analyze the relationship between the proportion of students served in Iowa school districts in special education classrooms (dependent variable) and variations in demographic, student, and socioeconomic factors among school districts and area education agencies. These relationships have implications for the equitable allocation of resources to support special education programs. The findings of this research will be used to make recommendations regarding the equitable distribution of available state dollars to fund special education programs in the state of Iowa. There is concern that the current method for distributing the state's financial resources to support special education is inequitable. This study identified differences in patterns of identifying and serving special education students which exist among school districts and administrative regions as defined by the boundaries of the area education agencies.

Research Hypotheses

The following are the specific questions and predictions addressed in the study.

Question 1: Are demographic, achievement, and socioeconomic factors related to the proportion of students served in special education in school districts?

1a. School districts with larger pupil enrollments will have a greater proportion of special education students.

1b. School districts with greater population density will have a greater proportion of special education students.

1c. School districts with high pupil-teacher ratios will have a greater proportion of special education students.

1d. School districts with a greater percentage of citizens over 18 years of age lacking a high school diploma will have a greater proportion of special education students.

1e. School districts where students achieve lower average scores on the Iowa Test of Basic Skills will have a greater proportion of special education students.

1f. School districts with a higher percentage of students receiving free and reduced price lunches will have a greater proportion of special education students.

1g. School districts with lower average per capita adjusted gross income will have a greater proportion of special education students.

1h. School districts with a lower per pupil assessed property value will have a greater proportion of special education students.

Question 2: Are demographic, achievement, and socioeconomic factors related to the proportions of students served in special education in AEAs?

2a. AEAs with a higher average district enrollment will have a greater proportion of special education students.

2b. AEAs with higher population density will have a greater proportion of special education students.

2c. AEAs with high school district average pupil-teacher ratios will have a greater proportion of special education students.

2d. AEAs with larger percentages of citizens over age 18 lacking a high school diploma will have a greater proportion of special education students.

2e. AEAs with lower average school district scores on the Iowa Test of Basic Skills will have a greater proportion of special education students.

2f. AEAs with a higher percentage of students receiving free and reduced price lunches will have a greater proportion of special education students.

2g. AEAs with a lower average per capita adjusted gross income will have a greater proportion of special education students.

2h. AEAs with a lower per pupil assessed property value will have a greater proportion of special education students.

Question 3: Is the relationship between demographic, achievement, and socioeconomic characteristics and the proportion of students with severe disabilities different from the relationship of these same factors and the proportion of students with mild/moderate disabilities?

Demographic, achievement, and socioeconomic variables will be stronger predictors of the proportions of students with mild/moderate disabilities than of the proportion of students with severe disabilities.

Question 4: Can a procedure be developed that would assist in predicting the proportion of a school district's population that should be served in special education?

Method

Subjects

The study included all 430 public school districts in the state of Iowa in the 1990-91 school year. Of those, 6 were eliminated from the study because at least one item was

missing in the data collected for each district. Over 50 school districts shared responsibilities for the provision of their educational program with a neighboring school district. The nature of these agreements varied greatly. Some districts' sharing agreements were limited to a joint superintendency between the two districts; others involved sharing students so that all students at a particular grade level in both school districts would be educated at the same attendance center. School districts that had merged their elementary school programs with that of another school district were eliminated from this study. This was done to avoid misrepresentation of achievement and demographic data gathered on an individual school district basis, when, in fact, many of the students attending the school would not be residents of the school district. Using this criterion, 16 school districts were eliminated, which left data from 408 school districts remaining in the study.

For purposes of this study, students requiring special education support services only, such as speech and language pathology, have been subtracted from the total number of school district or AEA special education students reported being served. A different method is used to fund special education support or related services in Iowa. Therefore, numbers served in these programs are not relevant to the current study.

Individual school district data were also compiled into 15 groups according to district membership in area education agencies. The special education division of each AEA provides support and related services as well as many of the assessment services which lead to individual student placements in special education.

Measures

Data used in this study were obtained from the Iowa Department of Education, the Iowa Department of Revenue and Finance, the Iowa Department of Management, and the University of Iowa Testing Program. The following is a description of each of the variables used in the study.

Proportion of special education students

The proportion of special education students was calculated for each of the 408 school districts included in the study. The proportion of students in special education was determined by dividing the number of students in the school district receiving special education instructional services by the total number of students enrolled in the school district. Both of these numbers include all resident pupils within the school district who attend public schools within the school district and, in the case of special education students, those students whose legal residence is within the district but who attend school in another school district. Private and parochial school students were not included.

Information regarding the numbers of students served in special education programs was obtained from the Iowa Department of Education state special education child count for December 1, 1990. This child count information also included the numbers of students in the school district assigned to each of the three weighted funding categories and the number of students assigned to each disability category. The figures for total number of pupils enrolled in each school district were obtained from the Iowa Department of Education certified enrollment of school districts based on data collected annually on the third Friday of September. The September 1990 count was used in this study.

The proportion of special education students was also calculated for each AEA. The number of special education pupils reported by the school districts within the AEA on

the December 1, 1990 special education child count was divided by the number of students appearing on the certified enrollment of the school districts within the AEA.

Demographic variables

District size District size was defined as the number of pupils reported on the 1990 certified enrollment of the school district. The certified enrollment is submitted to the Department of Education by each school district on the third Friday of September every year. This is considered the most accurate count of pupils within each school district because these data are used to generate funds under the state school foundation aid formula.

Population density Population density was measured by the number of pupils per square mile within the school district. It was calculated by dividing the number of pupils reported on the 1990 certified enrollment for each school district by the square miles contained in each school district and multiplying by 100 to obtain a percentage. This information was obtained from the Iowa Department of Education.

Pupil-teacher ratio Pupil-teacher ratios were calculated for each school district by dividing the number of full time teacher equivalencies employed in each school district in grades 1 through 6 by the number of pupils enrolled in the school district in grades 1 through 6 in September, 1990. This information was obtained from the enrollment file that is part of the Basic Educational Data Survey (BEDS), a report submitted to the Department of Education by every school district in September of each year.

Education level Education level for each school district was measured by the percentage of adults lacking a high school diploma. This information was obtained from a report written in 1985, based on the 1980 census data, published by the Iowa Department of Revenue and Finance.

Achievement variable

Student achievement Student achievement in school districts was measured by the Iowa Test of Basic Skills (ITBS) test scores (Hieronymous & Hoover, 1986). A normal curve equivalent (NCE) was calculated for each grade level in each district. An NCE is a normalized standard score with a mean of 50 and a standard deviation of 21.06. The sum of the NCE for grades 3, 4, 5, 6, 7, and 8 was divided by six to obtain an average NCE for each school district. This information was obtained from the Iowa Testing Program located at the University of Iowa.

Socioeconomic variables

Income level A measure of socioeconomic status was obtained by calculating the average adjusted gross income of persons filing individual income tax returns within the school district. This information was obtained from the Iowa Department of Revenue and Finance. It represents an average consisting of total adjusted gross income shown on either line 26 of the Iowa 1040 form or line 4 of the Iowa 1040A form reported within the school district's boundaries divided by the number of individual income tax returns filed within the school district's boundaries. Data used for this analysis were based upon 1989 Iowa tax returns.

Property values Assessed property value was used as a measure of the relative wealth of the school district. By dividing the assessed value of all property in the school district by the number of students in the district, a per student property tax base was obtained for each school district. The figures for assessed property value were obtained from the Iowa Department of Management, using 1989 information.

Free and reduced price lunch The number of students in each school district reported by the Department of Education in 1990 as having received free or reduced

price lunches was divided by the school district's certified enrollment for 1990. Because families must meet federally adopted criteria in order to qualify for free and reduced price lunches, this is considered to be one of the best measures of poverty among the student population of a school district.

Data Analysis

Data were analyzed using the SAS computational system. Descriptive statistics were calculated first. Then specific statistical tests were conducted to address the research questions. Correlation coefficients were used to measure the degree of association between the two variables contained in each of the hypotheses. Correlations measure linear associations and are stated in values between negative one and positive one. A value near positive one or negative one means that there is a nearly perfect relationship between the two variables. It is important to note that a relationship between two variables does not mean that there is a cause and effect relationship.

To measure the value of all of the variables in predicting the proportion of students served in special education, multiple regression procedures were used. Multiple regression is widely used in statistical analysis because it summarizes the relationship of several variables to some criterion with a simple expression called the R square statistic. This R square statistic, sometimes called the coefficient of determination, is an overall measure of the relationship of the predictor and the criterion variables. In this study, district size, population density, pupil-teacher ratio, education level, student achievement, income level, property value, and percentage of free and reduced price lunches were the predictor variables and proportion of students in special education was the criterion variable.

Research question 1

Pearson Correlations were used to determine the strength of the relationships between demographic, achievement, and socioeconomic variables and the proportion of special education students in a school district. Demographic variables used were district size, population density, pupil-teacher ratios and education level. Scores on the Iowa Test of Basic Skills were used as a measure of achievement. Socioeconomic variables included average income, property values, and percentage of free and reduced price lunches.

Research question 2

A series of Pearson Correlations were performed to test the strength of the relationships between demographic, achievement, and socioeconomic variables and the proportion of special education students in an AEA.

Research question 3

Correlation analyses were used to assess the strength of the relationship between the independent variables and the proportion of severely disabled students as compared to the proportion of mild/moderately disabled students. The first correlation analysis assessed the strength of the relationship between proportions of severely disabled students and the independent variables; a second correlation analysis assessed strength of the relationship between the proportions of mild/moderately disabled students and the independent variables. The R squares obtained from each of the analyses were transformed to standard scores in order to compare the two statistics using a Hotelling's t test.

Research question 4

A multiple regression analysis was conducted to determine the strength of demographic, achievement, and socioeconomic characteristics in predicting the proportion of special education students within a school district or an AEA. Those factors shown to be significant predictors were used to develop a formula which could be used as the basis for the distribution of special education funds.

The four questions posed in this chapter were answered through statistical correlation and multiple regression analysis. The results provide direction to the general problem posed in this study which was to develop an equitable process for the distribution of funds for special education in school districts in Iowa.

CHAPTER IV

RESULTS

The purpose of this chapter is to present the research findings from statistical analysis of the data. Data for the project were analyzed at the Iowa State University Psychology Department. Statistical analyses were conducted using the Statistical Analysis System Version 6.06 (SAS) on the University's IBM mainframe computer.

The chapter is divided into two parts. Descriptive statistics are presented first by AEA, and then by statewide totals. Results related to the four research questions developed in chapter three are then presented and discussed. The reader may wish to refer to Appendix A for a map noting the geographical location of each of the AEAs.

Descriptive Statistics

Proportion of students in special education

Proportion of students in special education, defined by dividing numbers of special education students by the total enrollment, was the dependent variable used in this study. The proportion of students served in special education varied among the 15 AEAs by almost 3%, from a low in AEA 10 of 7.88% to a high in AEA 14 of 11.66% (see Table 3). Greater differences were observed among school districts. For example, a school district in AEA 11 had a 3.12% proportion of students in special education; in contrast, the proportion in a school district in AEA 5 was 17.24%. The most extreme variation was found in AEA 5 where school district proportions varied from 4.03% to 17.24% (see Table 3). There appears to be little consistency among school districts regarding proportions of students in special education.

Table 3. Proportion of Students in Special Education by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	8.97	2.68	6.15	15.79
2	26	9.75	2.36	5.19	14.29
3	21	9.11	2.48	5.43	14.20
4	18	8.98	2.74	4.10	14.00
5	40	9.22	3.11	4.03	17.24
6	16	9.21	2.50	4.75	13.43
7	26	8.39	1.79	4.66	12.28
9	23	8.01	1.91	5.38	12.14
10	38	7.88	1.50	4.91	11.19
11	57	8.89	2.02	3.12	13.61
12	27	8.91	1.80	6.07	11.90
13	32	9.72	2.56	3.26	16.51
14	22	11.66	2.65	7.48	16.41
15	24	9.46	1.62	5.71	12.36
16	13	9.79	1.98	7.00	12.40
State	408	9.11	2.39	3.12	17.24

Average weighting for students in special education

Students receiving special education services are assigned to one of three weighted categories depending on the extent of their need for specialized services. These weighted categories are: (a) 1.68 for mild disabilities, (b) 2.35 for moderate disabilities, and (c) 3.52 for severe disabilities. The weightings are used to generate funds under terms of the

School Foundation Plan to pay for the additional special education costs. (Regular education students are assigned a weight of 1.0.) So, for example, a student weighted as 1.68 would generate 1.68 times that school district's average cost per pupil for a regular education student. Table 4 shows the average weighting assigned to special education students in school districts within each AEA and the state average.

Table 4. Average District Weighting of Special Education Students by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	1.81	.06	1.70	2.00
2	26	1.87	.10	1.68	2.04
3	21	1.86	.10	1.68	2.14
4	18	1.84	.09	1.68	2.01
5	40	1.86	.12	1.68	2.26
6	16	1.80	.06	1.71	1.90
7	26	1.93	.08	1.82	2.14
9	23	1.86	.16	1.68	2.13
10	38	1.80	.06	1.68	1.98
11	57	1.85	.07	1.74	2.07
12	27	1.86	.06	1.74	2.00
13	32	1.83	.08	1.70	2.08
14	22	1.82	.06	1.70	1.96
15	24	1.78	.06	1.68	1.92
16	13	1.81	.05	1.71	1.90
State	408	1.84	.08	1.68	2.26

These numbers were obtained by dividing the total weightings of all special education students by the number of special education students. This average weighting could theoretically range from 1.68, if all students in an AEA were determined to be mildly disabled, to 3.52, if all students in an AEA were determined to be severely disabled. It is clear from looking at the range of average weightings that the majority of students are served in programs for mild disabilities, with the average weighting ranging from 1.78 in AEA 15 to 1.93 in AEA 7. It is interesting to note that in 7 AEAs there is at least one school district with only mildly disabled students (indicated by the average weighting for the school district of 1.68) (see Table 4). There is a wide range of average weightings from a low of 1.68 in some districts to a high of 2.26 in a school district in AEA 5. This difference of .58 translates to a dollar per pupil difference of approximately $2000. This means that the school district in AEA 5 with an average weighting of 2.26 has $2000 more in available funds per special education pupil than the school districts with an average weighting of 1.68.

Demographic variables

Demographic variables of district size, population density, pupil-teacher ratio, and educational level were the first set of independent variables analyzed. District size was measured by the certified enrollment of the school district (see Table 5). There is wide variation in the size of Iowa school districts; from 128 to 30,295 students. The smallest average size for school districts was in AEA 14 and the largest in AEA 9.

The information on school district size is consistent with the population density for each of the AEAs as measured by the number of pupils per square mile (see Table 6). AEA 9 includes larger school districts (including the eastern Iowa cities of Davenport, Clinton, Muscatine, and Bettendorf) with a student population density of 50.79 per square

mile. This contrasts with AEA 14 with no large population centers and an average of 3.06 students per square mile. The existence of at least one large urban school district accounts for the higher numbers of students per square mile in AEAs 7, 9, 10, 11, 12, and 16. It should be noted that all of the AEAs include a significant number of smaller, more sparsely

Table 5. District Enrollment by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	1315	1820	289	9619
2	26	784	918	161	4706
3	21	575	559	133	2287
4	18	602	294	205	1160
5	40	616	769	132	4702
6	16	1022	1110	299	4823
7	26	1283	2392	295	12073
9	23	2246	3754	186	17898
10	38	1472	2973	192	16848
11	57	1735	4035	169	30295
12	27	1095	2611	214	13998
13	32	988	1727	226	9980
14	22	553	437	128	1726
15	24	991	1038	204	4894
16	13	1468	1562	213	5800
State	408	1160	2356	128	30295

populated districts. For example, AEA 12 is shown as sixth from highest in pupil density; however, over half of the students in AEA 12 reside in the Sioux City School District. The remainder of the AEA 12 schools are scattered over a wide geographic area in which there are 26 separate school districts.

Table 6. Pupils Per Square Mile by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	6.62	7.26	2.67	40.08
2	26	6.45	9.47	1.73	49.54
3	21	4.77	5.06	1.68	21.78
4	18	4.34	1.75	2.62	8.74
5	40	4.65	4.96	1.54	29.57
6	16	6.70	7.38	2.69	33.49
7	26	12.31	20.43	3.16	81.77
9	23	50.79	115.02	2.86	486.89
10	38	23.14	65.97	2.76	390.50
11	57	30.81	86.80	2.17	536.33
12	27	12.11	41.40	2.16	218.72
13	32	9.50	23.72	2.23	134.87
14	22	3.06	1.93	1.02	8.81
15	24	5.57	7.40	1.63	37.65
16	13	27.98	46.65	4.26	161.33
State	408	15.01	50.75	1.02	536.33

Average pupil-teacher ratios for each AEA and the state are displayed in Table 7. These figures represent the average number of students assigned to each classroom teacher, grades 1 through 6, within the AEA. The high and low AEA averages of the school district pupil-teacher ratios were 14.98 in AEA 14 and 17.69 in AEA 15, adjacent AEAs located in the southern tier of Iowa counties. Also important is the fact that this information

Table 7. District Pupil-Teacher Ratio by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	17.22	2.15	14.13	22.88
2	26	16.39	3.42	10.89	25.75
3	21	15.93	3.08	10.32	20.00
4	18	15.32	1.77	12.03	19.19
5	40	15.75	3.51	8.54	25.17
6	16	16.11	2.13	12.45	21.41
7	26	16.34	2.28	12.21	21.02
9	23	17.45	2.86	10.23	22.62
10	38	16.47	2.87	12.38	24.13
11	57	17.56	2.97	10.14	25.42
12	27	16.29	2.45	11.15	21.83
13	32	16.88	2.69	12.87	22.45
14	22	14.98	3.39	8.97	21.64
15	24	17.69	2.95	11.67	23.33
16	13	16.83	2.24	13.45	19.93
State	408	16.57	2.90	8.54	25.75

is reported to the Department of Education by each school district and is not audited in any manner. Pupil-teacher ratios from grades 7 through 12 as well as kindergarten were omitted from this analysis because those data are considered to be inconsistent and unreliable. Those school districts reporting the very high and very low pupil-teacher ratios of 8.54 and 25.42 are among the smallest school districts in the state.

The percentage of adults lacking a high school diploma was used as a measure of educational level. This statistic is a commonly used measure of literacy and in national comparisons, Iowa typically has one of the lowest percentages of citizens without a high school diploma. As can be seen in Table 8, less than 0.5% of Iowa's adults failed to complete a high school education. AEA 4, located in rural northwest Iowa, had the lowest percentage of adults lacking a diploma. AEA 7, with a significant minority and urban population, had the highest percentage.

Achievement variable

Normal curve equivalent (NCE) scores on the Iowa Test of Basic Skills were used to represent average achievement of students in school districts. The scores are presented by AEA and by state averages in Table 9. There was little range noted in average scores (a high in AEA 7 of 63.96 to a low in AEA 15 of 59.15). Individual district scores varied from a high of 73.60 to a low of 65.20, fewer than 10 points. Since these are mean scores, no greater variation would be expected. These results further confirm the well known finding of relatively high achievement among students in Iowa. As a note of further explanation, the district NCE averages are based on the NCE averages for students in the district in grades 3, 4, 5, 6, 7, and 8 using national norms. These NCEs are *not* district rankings, which explains the relatively small range. If district rankings were used, many of the Iowa school districts would have much higher NCEs.

Table 8. Percent of Adults Lacking High School Diploma by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	0.96	1.46	0.02	7.19
2	26	0.45	.80	0.01	4.06
3	21	0.28	.31	0.04	1.32
4	18	0.20	.10	0.09	0.43
5	40	0.26	.28	0.00	1.29
6	16	0.31	.32	0.05	1.38
7	26	0.64	.72	0.05	3.53
9	23	0.65	.94	0.12	3.93
10	38	0.53	.89	0.04	5.26
11	57	0.51	.96	0.00	6.81
12	27	0.22	.23	0.00	1.14
13	32	0.31	.44	0.03	2.21
14	22	0.35	.39	0.02	1.30
15	24	0.42	.74	0.03	3.61
16	13	0.71	.93	0.08	3.53
State	408	0.49	1.09	0.00	7.19

Table 9. Iowa Test of Basic Skills NCE Scores by AEA and State *

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	63.45	3.21	57.50	69.40
2	26	63.75	3.20	55.80	73.60
3	21	62.86	3.04	58.00	71.70
4	18	65.90	3.77	56.70	70.80
5	40	61.56	3.31	53.80	66.80
6	16	63.09	3.25	56.80	68.60
7	26	63.96	3.63	53.10	68.60
9	23	60.03	3.90	53.80	67.00
10	38	61.13	3.39	54.00	68.10
11	57	62.49	3.86	50.90	69.70
12	27	62.66	3.77	55.70	70.60
13	32	60.61	4.27	50.50	67.40
14	22	59.17	3.94	51.10	65.90
15	24	59.15	3.39	51.50	65.20
16	13	59.95	3.01	55.40	65.40
State	408	61.96	3.92	50.50	73.60

* Sum of NCE scores for grades 3 to 8 were averaged to obtain an average NCE.

Socioeconomic variables

Socioeconomic status of school districts and AEAs was measured by three variables: (a) average gross income of district residents, (b) per pupil tax base, and (c) percentage of students receiving free and reduced lunch. The AEAs forming the corridor

from Davenport to Des Moines, AEAs 9, 10, and 11, had the highest average gross income. The highest average gross income was in AEA 11, which includes Des Moines and the surrounding suburbs. The area reporting the lowest average gross income was AEA 14, a rural area in southern Iowa (see Table 10).

Table 10. Average Gross Income by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	15246.38	1270.94	13917.12	19706.74
2	26	16137.26	1210.03	13575.48	18667.35
3	21	16025.49	1380.45	14295.49	19640.18
4	18	16006.66	1159.88	13317.73	18291.63
5	40	16230.93	1270.91	14297.22	19978.39
6	16	16398.67	1487.46	14765.30	19852.54
7	26	17497.93	1987.17	14433.36	22702.14
9	23	18197.00	3620.80	14270.09	28377.68
10	38	18186.31	3055.89	12737.90	25341.27
11	57	18555.27	3577.68	13837.19	32437.46
12	27	16325.03	1651.31	13890.24	20288.86
13	32	16478.10	1888.88	13631.85	22322.36
14	22	14102.29	1528.60	11595.07	17145.97
15	24	15172.22	1698.87	12444.91	19354.95
16	13	17415.56	1352.17	14719.50	19293.35
State	408	16735.00	2553.91	11595.07	32437.46

Per pupil assessed property value is another measure of the relative wealth of school districts and AEAs (see Table 11). The average value of property per school child ranged from approximately $350,000 in AEA 2 to a low of $67,500 in AEA 15. These represent north-central and southeastern counties respectively, and would reflect, primarily, differences in land values between the two geographic regions.

Table 11. Per Pupil Tax Base by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	151395.26	27733.70	86712.10	200912.74
2	26	232610.84	88411.29	140505.60	464574.04
3	21	245353.71	78209.41	89513.10	461534.90
4	18	199837.62	43362.88	128331.71	284212.34
5	40	231195.13	71671.84	114791.99	437507.73
6	16	175886.61	62270.69	66649.23	315629.70
7	26	152123.80	43936.99	97642.42	266336.21
9	23	152459.86	43982.52	86948.92	250758.21
10	38	160441.65	58149.88	94558.51	431504.79
11	57	149463.73	60787.68	67047.60	334840.43
12	27	190168.65	58724.02	87704.52	328534.63
13	32	168115.68	47335.77	69925.30	254347.80
14	22	151733.33	35039.03	100893.38	239433.73
15	24	142313.72	67446.12	76549.32	340750.01
16	13	152389.99	38919.29	92663.17	210237.43
State	408	176400.00	66880.00	66649.23	464574.04

The average percentage of students receiving free or reduced price school lunches is presented in Table 12. The highest proportion was in AEA 14 where almost one-third of students receive free or reduced price lunches. In contrast, fewer than one-eighth of students received free or reduced price lunch in AEA 10. Wide variations among school

Table 12. Percentage of Students Receiving Free or Reduced Price Lunch by AEA and State

AEA	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
1	25	23.50	5.56	14.68	34.13
2	26	23.46	6.03	11.81	36.82
3	21	26.57	8.07	13.33	41.81
4	18	22.78	5.20	12.91	31.47
5	40	26.69	8.93	10.24	59.31
6	16	21.10	6.47	11.44	34.78
7	26	19.33	6.11	9.63	35.45
9	23	18.36	7.22	6.88	30.86
10	38	17.12	5.87	4.46	29.48
11	57	17.21	8.54	2.11	40.00
12	27	27.80	8.25	16.67	45.69
13	32	25.24	9.21	6.96	51.85
14	22	32.54	7.37	19.02	42.97
15	24	29.41	8.07	16.25	50.33
16	13	19.67	5.90	11.98	13.33
State	408	22.95	8.72	2.11	59.31

districts are apparent. Over half of the students in some school districts received free and reduced price lunches while in other districts, only 2% to 3% of students were eligible.

Results Related to Research Questions

School district demographic, achievement and socioeconomic factors

The first question (Are demographic, achievement, and socioeconomic factors related to the proportion of special education students in a school district?) included four hypotheses: a) school districts with larger enrollments will have a greater proportion of special education students; (b) school districts with greater population density will have a greater proportion of special education students; (c) school districts with higher pupil-teacher ratios will have a greater proportion of special education students; and (d) school districts with greater numbers of citizens over age 18 lacking a high school diploma will have a greater proportion of special education students.

A Pearson correlation analysis was used to test each of these hypothoses (see last line of Table 13). District size was found to be positively correlated to the proportion of students in special education in the overall analysis for the state and within two AEAs. The overall correlation means that larger school districts have higher proportions of students in special education. However, the size of the correlation was extremely small ($r = .11$, $p < .05$). While a correlation of this size is statistically significant and the variance accounted for is likely to be reliable, the size of the relationship is so small that it may not have practical implications.

Population density was not significantly related to statewide proportions of students served in special education (see last line of Table 13). The correlation of .00 indicates no

Table 13. Correlation between Selected Variables and Proportion of Special Education Students by AEA and State

AEA	Size	Pop. Density	P-T Ratio	Ed. Level	ITBS Scores	AGI	Property Value	% Free Lunch
1	.15	.10	.13	.13	.43*	.06	.17	.17
2	.05	.07	–.39*	.05	.02	–.07	.12	.32
3	.30	.08	–.02	.15	–.01	–.07	–.11	–.04
4	.35	–.05	.05	.16	.08	–.01	–.13	.21
5	.13	.12	–.13	-.07	–.26	.09	.06	.30
6	.55*	.48	.08	.34	–.44	.34	–.49	.13
7	.51**	.49*	.09	.48*	–.47*	.38	.33	.34
9	.22	–.06	.02	.32	–.29	–.24	–.63**	.47*
10	.24	.17	–.09	.39*	–.11	–.17	–.13	.48**
11	.14	–.06	–.08	.15	–.42**	–.05	–.02	.01
12	.33	.34	–.19	.00	–.56**	.00	.04	.24
13	.20	.23	–.04	.24	–.40*	.22	–.12	.42*
14	–.17	–.29	–.20	–.43*	–.49*	–.51*	–.03	.30
15	.40	.43*	–.21	.36	–.43*	.46*	–.05	–.10
16	.29	.60*	.32	.34	–.49	.42	–.12	.27
State	.11*	.00	–.11*	.11*	–.30**	–.12*	–.03	.31**

* $p < .05$.

** $p < .01$.

relationship between population density and proportions of students served in special education.

Pupil-teacher ratios were negatively correlated with proportions of special education students ($r = -.11$, $p < .05$). This correlation is in the opposite direction of that proposed by the research hypothesis. Districts with higher pupil-teacher ratios had lower proportions of students in special education. Again, the size of this correlation was small ($r = -.11$, $p < .05$). The practical implications of this finding also are questionable.

School districts with higher numbers of adults lacking high school diplomas had higher proportions of students in special education. The magnitude of this relationship was, again, small ($r = .11$, $p < .05$).

Three of the four demographic measures were significantly correlated with proportions of students in special education. The magnitude of the relationship of district size, pupil-teacher ratio, and education level accounted for a very small part of the variance in proportions of students in special education.

A Pearson correlation analysis was used to test the hypothesis that school districts with lower average scores on the Iowa Test of Basic Skills will have higher proportions of students in special education than school districts with higher average scores. The statistical analysis yielded an r of -.30, ($p < ,05$) (see Table 13). This correlation translates to 9% of the variance in proportions of students in special education being related to achievement.

The following hypotheses were tested relative to the influence of socioeconomic factors: (a) school districts with a lower average per capita adjusted gross income will have a greater proportion of special education students; (b) school districts with a lower per pupil assessed property value will have a greater proportion of special education students; and

(c) school districts with a higher percentage of students receiving free and reduced price lunches will have a greater proportion of special education students.

Pearson correlation analysis were calculated to test each of these hypotheses (see last line of Table 13). Average gross income was significantly correlated at the .01 level ($r = .12$). While only 1% of the variance in proportions of special education students might be accounted for, the correlation was in the predicted direction. There were proportionately fewer students in special education in school districts reporting higher average gross incomes.

Per pupil property tax base was not significantly correlated with proportions of students in special education ($r = .03$). Two factors may account for the absence of a statistical relationship. The value of property in a rural state such as Iowa may not be an accurate measure of socioeconomic status. Second, only 21% of the money to support special education comes from local property taxes. The other 79% is received from state aid to local school districts. Therefore, school district property values have relatively little influence on the financial support for special education programs.

Results of the correlation analysis indicated a positive relationship between percentage of students receiving free and reduced price lunches and proportion of students in special education ($r = .31$, $p < .01$). The percentage of students receiving free and reduced price lunch accounts for approximately 9% of the variance found in special education proportions. Proportions of free and reduced price lunches is a measure of poverty within the student population as opposed to average income and property values which measure poverty across the school district as a whole. Therefore, it might be expected that this statistic would correlate more highly with proportions of students in special education than the other two socioeconomic variables.

All but two of the eight demographic, achievement, and socioeconomic variables were significantly correlated with the proportion of students in special education. With the exception of pupil-teacher ratios, all correlated in the direction expected in the hypotheses. From this analysis, one could conclude that large size school districts, low pupil-teacher ratios, low education level, low achievement, low adjusted gross income, and high percentages of free lunch are related to the higher proportions of special education students. Analyses presented later examine whether the size of these relationships explain the wide variations in the proportions of special education students among Iowa school districts.

AEA demographic, achievement and socioeconomic factors

The second question (Are demographic, achievement, and socioeconomic factors related to the proportions of students in an AEA served in special education?) was designed to test the relationship between the eight independent variables identified in the study and the proportion of students in each AEA served in special education. Correlations with special education proportions were examined for: district size, population density, pupil-teacher ratio, education level, student achievement, free and reduced price lunches, adjusted gross income, and per pupil property tax values (see Table 13).

Although six of the eight variables were statistically significant on a statewide basis, few were significant when analyzed by AEA (see Table 13). Achievement was the most significant variable in the AEA analysis, with 7 of the 15 AEAs showing significant relationships between lower NCE scores on the Iowa Test of Basic Skills and higher proportions of students in special education. Population density, which was not a significant variable in the statewide analysis, was significantly correlated with proportions of special education students in three AEAs. In these three AEAs, higher population density was related to higher proportions of special education students. Although

percentage of students receiving free and reduced price lunches had the strongest correlation to proportions of special education students in the statewide analysis, it was significant only in the two AEAs with the lowest proportion of students in special education.

Figures 1 through 6 are scatter graphs which depict the relationship of the proportion of students in special education to each of the six independent variables which were statistically significant in the correlation analysis. Each data point represents an AEA. An ordinary least squares regression line was drawn through the data points on each graph. This line is the result of a mathematical formula that minimizes the cumulative distances of all data points to the line (i.e., the residuals). The closer a data point is to the line, the more accurately that data can be used to predict proportions of students in special education. As can be seen from the visual display of the data, there is one AEA which is consistently furthest away from the line of best fit, suggesting that demographic, achievement, and socioeconomic variables are less predictive of special education proportions for this AEA than for other AEAs.

In general, the relationships of demographic, achievement, and socioeconomic variables to proportion of special education students in AEAs were inconsistent and appear to be highly idiosyncratic to a particular AEA. Some isolated instances of strong correlations between the variables were found, but no general pattern of relationships could be discerned from the AEA analysis.

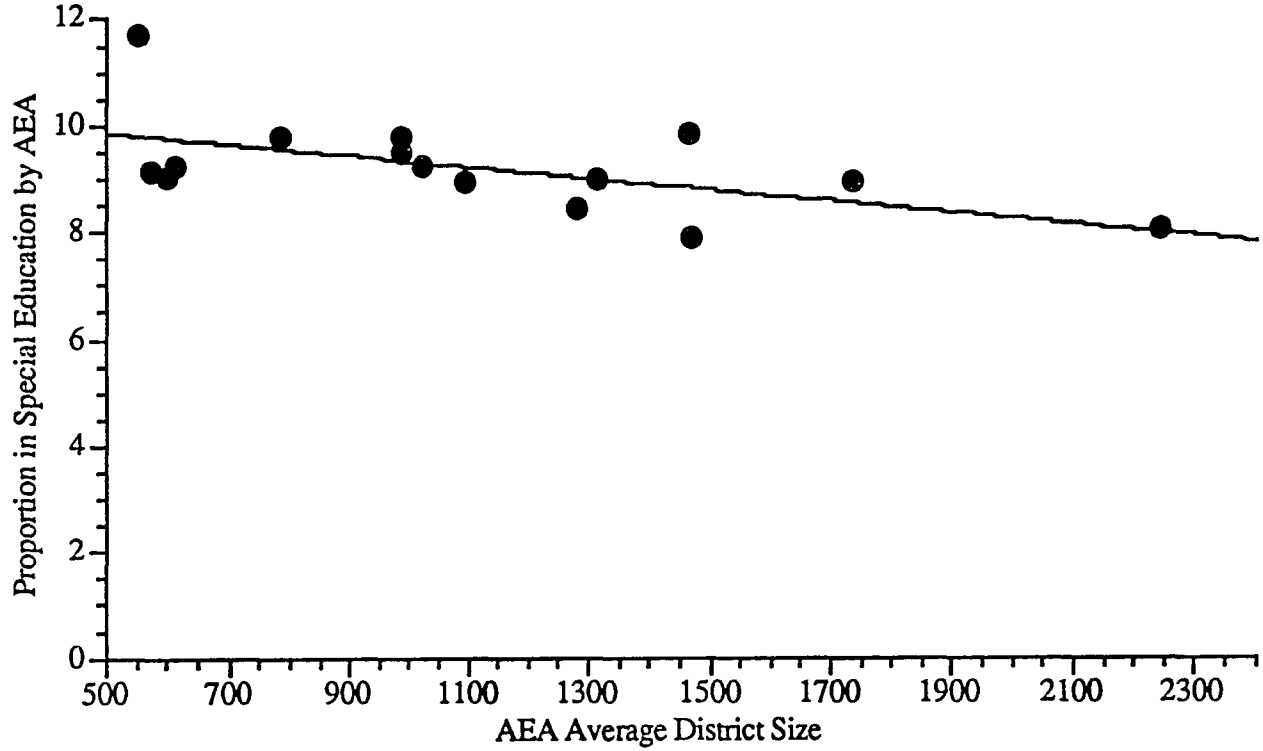

Figure 1. Predicted and Actual AEA Special Education Proportion Using AEA Average District Size

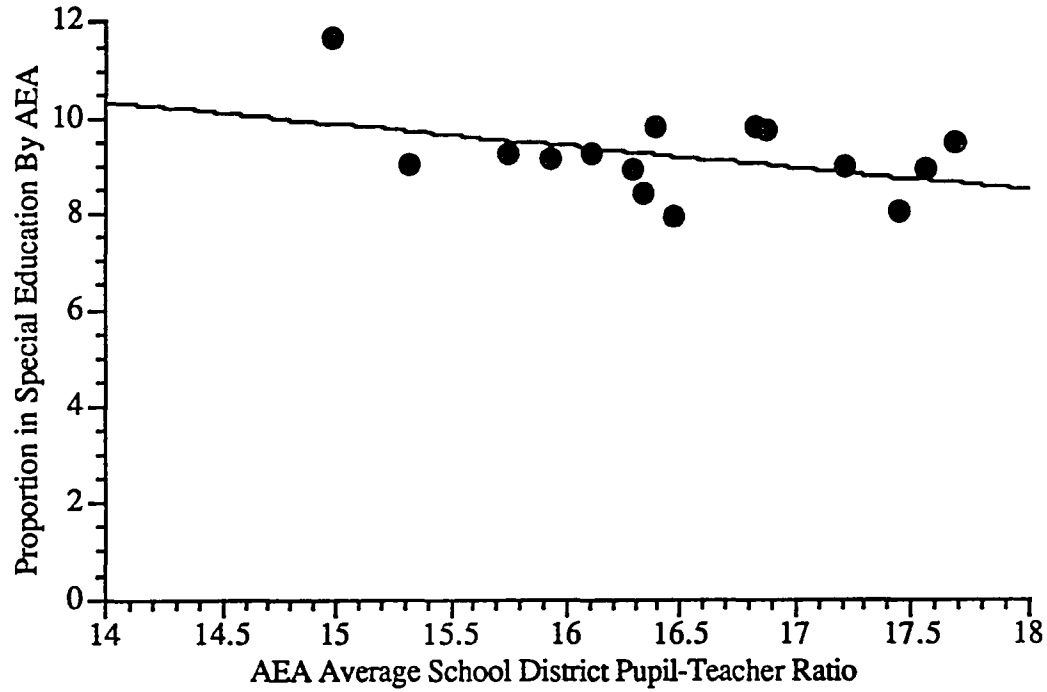

Figure 2. Predicted and Actual AEA Special Education Proportion Using School District Average Pupil-Teacher Ratios

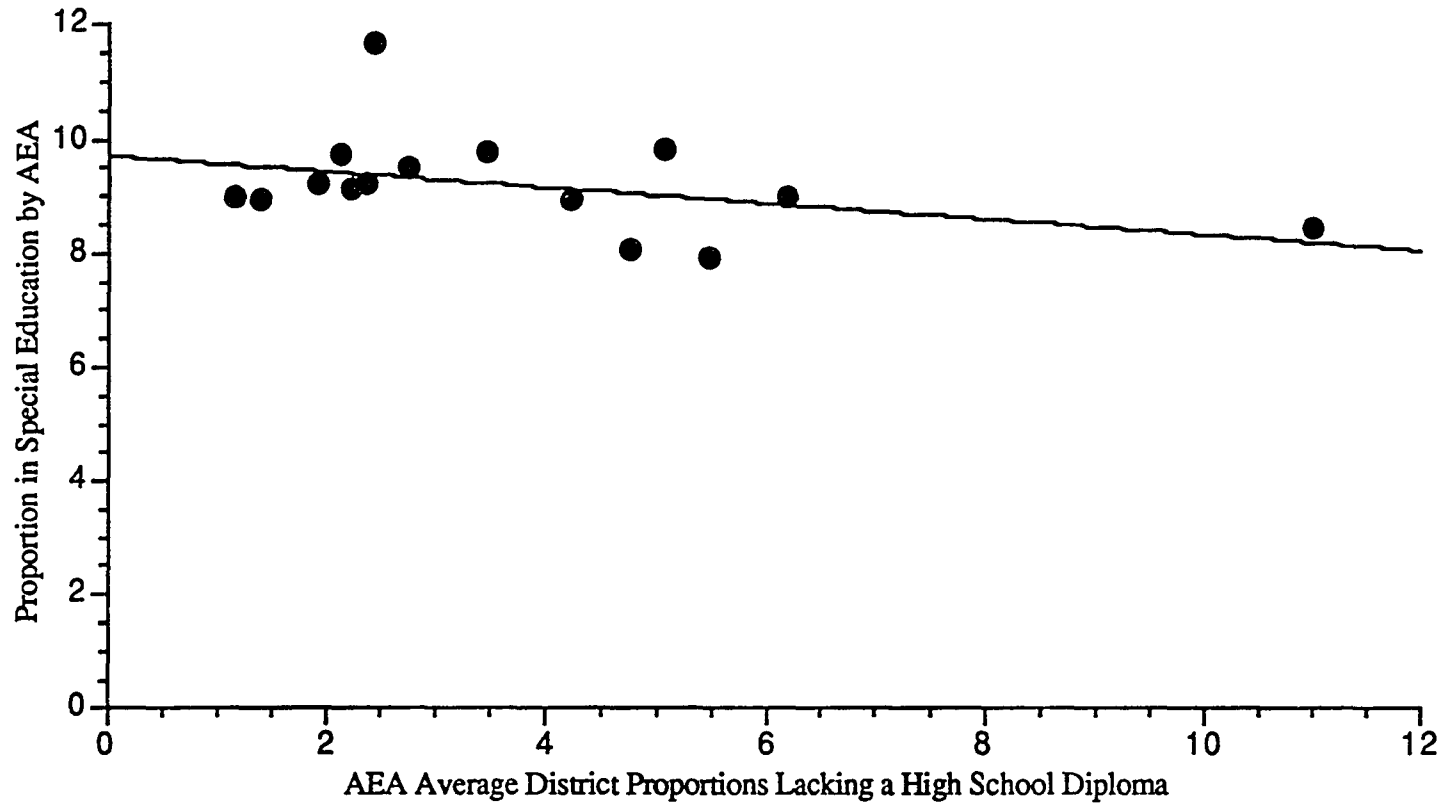

Figure 3. Predicted and Actual AEA Special Education Proportion Using AEA Average School District Proportions of Adults Lacking a High School Diploma

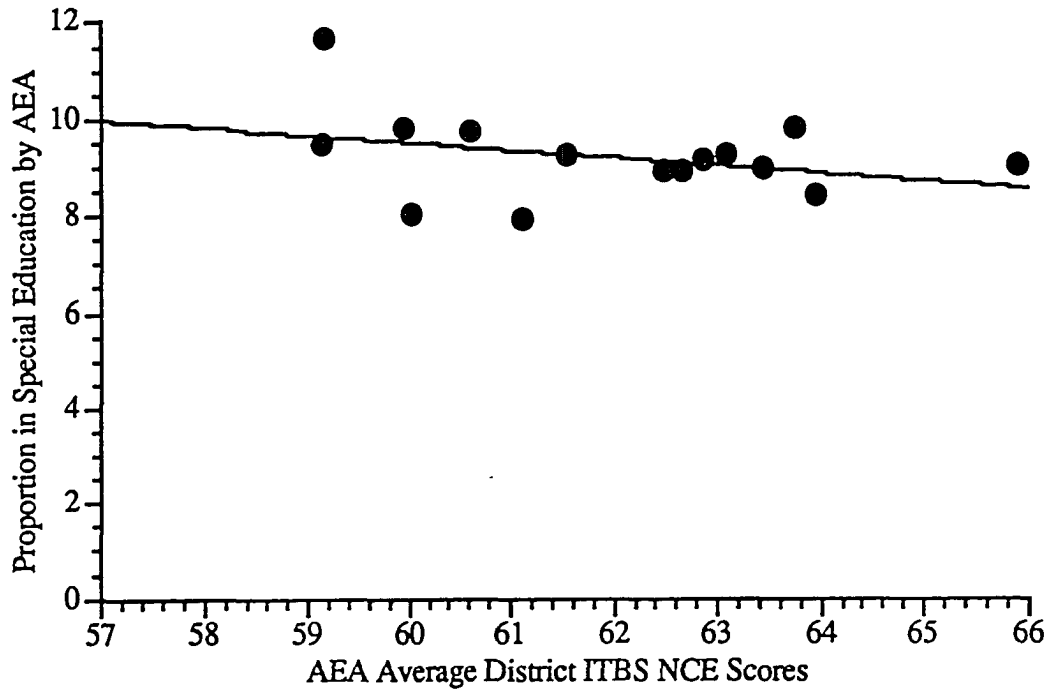

Figure 4. Predicted and Actual AEA Special Education Proportion Using AEA Average District ITBS NCE Scores

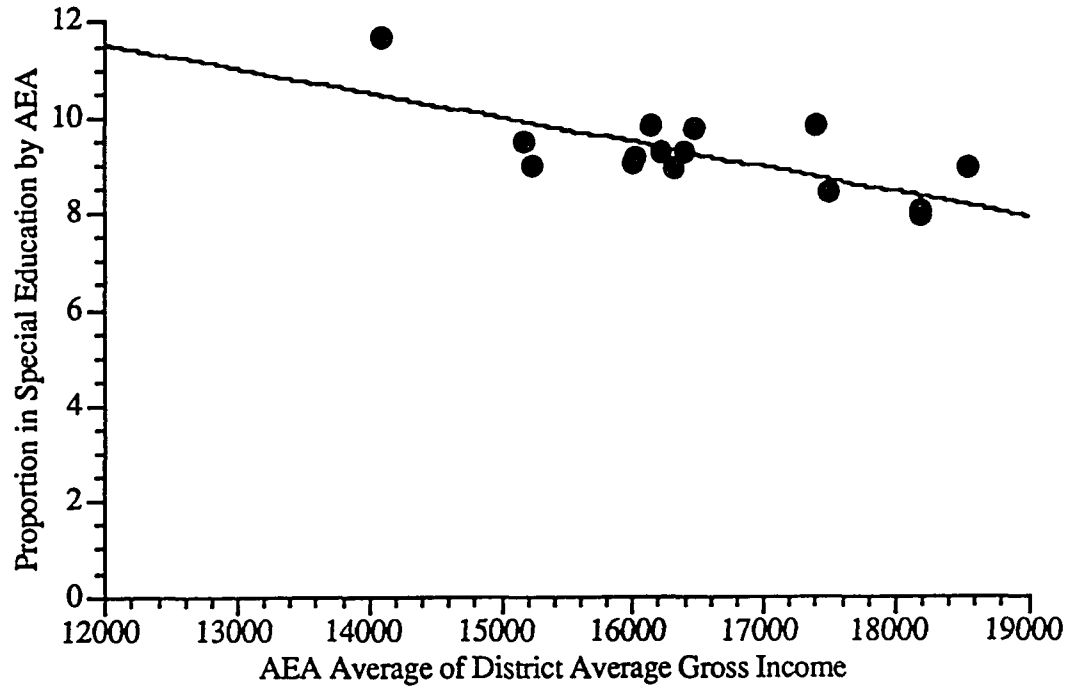

Figure 5. Predicted and Actual AEA Special Education Proportion Using AEA Average of District Average Gross Income

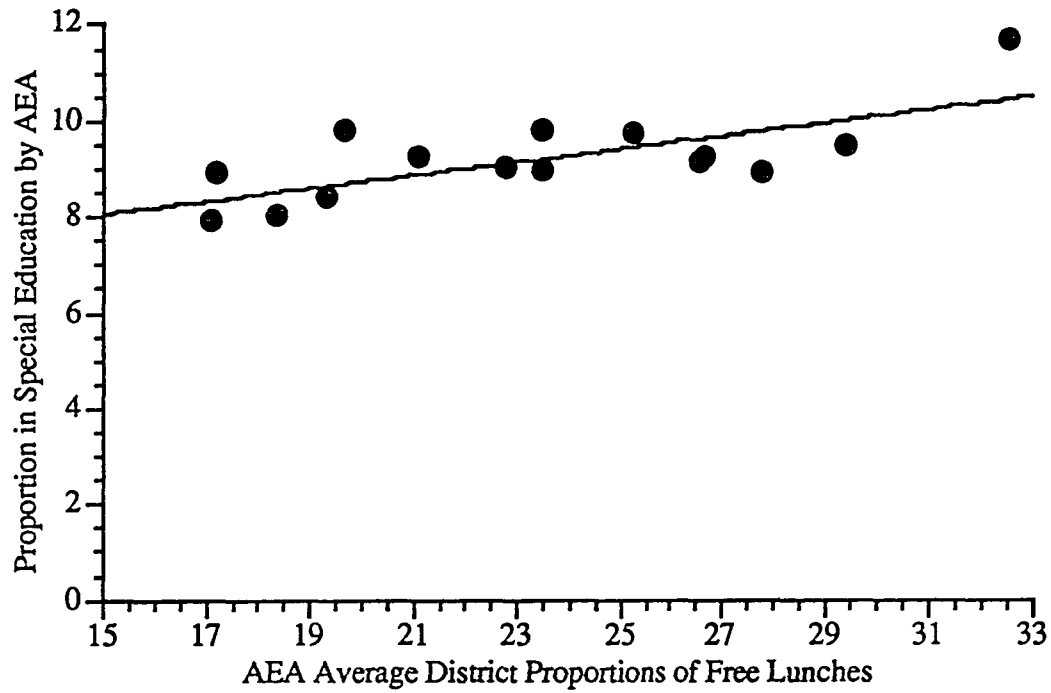

Figure 6. Predicted and Actual AEA Special Education Proportion Using AEA Average District Proportions of Free and Reduced Price Lunches

Demographic, achievement and socioeconomic factors: mild/moderate compared to severe

In question three (Is the relationship between demographic, achievement, and socioeconomic factors and the proportion of students with severe disabilities different from the relationship of these same factors and the proportion of students with mild/moderate disabilities?) the eight independent variables were expected to be more highly correlated with proportions of students with mild/moderate disabilities than those students with severe disabilities. To test this hypothesis, proportions of students in special education were divided into two categories: mild/moderately disabled students with weightings of 1.68 and 2.35 and severely disabled students with weightings of 3.52. Pearson correlations were calculated to examine the relationship of the proportion of students in each category with each of the eight independent variables. The difference between the correlation of each of the independent variables with the two categories was examined using Hotelling's t test, a test for determining differences between two dependent correlation coefficients (Glass & Hopkins, 1970, p. 310).

Table 14 contains the t values obtained for each of the eight independent variables. Differences for all but two of the variables and the proportion of special education students is significantly different between the mild/moderate and the severe populations. District size and education level are better predictors of the proportions of students in programs for severely disabled. The relationship between larger school districts and school districts with higher percentages of citizens lacking high school diplomas was stronger with the population of severely disabled compared to the mild/moderate population. A special education student enrolled in a large school district is more likely to be served in a program for the severely disabled than a student enrolled in a small school district.

The question unanswered in this research is the reason for this phenomenon. One answer suggested in prior literature is that families requiring those services move to urban areas. Another possible answer would be that these large school districts were operating special classes and facilities for the disabled prior to the 1975 mandate when most all students with disabilities were served in segregated programs and continue to the present serving students in more restrictive environments.

Table 14. Differences in Relationship of Variables Between Mild/Moderate and Severe Populations

Variables	r mild/moderate.	r severe.	t
Size	0.07055	0.26559	–2.8726*
Pop. Density	–0.02356	0.14294	–2.5051
P-T Ratio	–0.12679	0.06365	–2.9098*
Ed. Level	0.05063	0.25512	–3.0160*
ITBS Scores	–0.30214	–0.08483	–3.4445*
AGI	–0.14303	0.10041	–3.7166*
Property Value	–0.04829	0.06800	–1.7645
% Free Lunch	0.30467	0.10536	3.1552*

* $p < .01$.

Note. t values represent Hotelling's t with 405 degrees of freedom.

Pupil-teacher ratios, ITBS scores, average gross income, and percentage of students receiving free lunch were correlated with the two categories in the manner predicted in the hypothesis. Low pupil-teacher ratios, low achievement, low income, and

high percentages of students receiving free lunch are more highly related to proportions of students in programs for mild/moderately disabled than in programs for severely disabled. This would seem to verify conclusions of earlier research (Gelb & Mizokawa, 1986; Noel & Fuller, 1985; Reschly, 1988b; Edgar & Hayden, 1985) which has differentiated between the nature of two types of students with disabilities: those with organic or sensory impairments who would most likely be severely disabled and recognized as such in all systems and those in programs for the more mildly disabled whose impairments are relative and determined to a greater extent by judgment.

Demographic, achievement, and socioeconomic factors: prediction equation

To address the fourth question (Can a procedure be developed that would assist in predicting the proportion of a school district's population that should be served in special education?) a stepwise multiple regression analysis was conducted to determine which combination of the eight independent variables would be most useful in predicting proportions of students in special education. Forward selection procedure was used. Results of the multiple regression analysis are displayed in Table 15. The five variables that were retained in the final equation were: ITBS scores, average gross income, pupil-teacher ratio, district size, and percentage of free and reduced price lunch. The R square value was .1669, meaning that less than 17% of the variance in proportions of special education students in Iowa school districts was accounted for by demographic, achievement, and socioeconomic differences among districts.

Plans calling for special education funds to be distributed based upon a standard percentage of student enrollment in each school district have been criticized because it is charged that proponents of such plans have not taken into account the individual characteristics of school districts. To address this issue, a formula was developed to

differentially weight the three variables which were found in the multiple regression analysis to be most useful in predicting proportions of students served in special education: achievement, district size, and percentage of students on free and reduced price lunches.

Table 15. Multiple Regression Results

	Overall Contribution Variable in Isolation		Unique Contributions Controlling for All Other Variables	
Source	SS	F	SS	F
ITBS Scores	214.26	44.44	113.65	23.57
AGI	12.82	2.66	4.93	1.02
P-T Ratio	24.96	5.18	21.00	4.36
Size	33.10	6.87	10.21	2.12
% Free Lunch	103.16	21.40	103.16	21.40

The beta weights of these three variables were multiplied by the measure of the variable in a particular district. The general formula is presented in equation 1.

$$\text{Equation 1.} \quad \hat{y} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon$$

Equation 1 has been created to predict the percentage of students in each school district who are served in special education, based on demographic, achievement, and socioeconomic variables. Appendix B documents the predicted and actual percentage of students in special education by school district number and AEA.

The following is an example of how the percentages in column 5 of Appendix B were derived. School district number 1082 currently serves 8.3930 % of students in special education (see Appendix B, Observation 179, Column 4). Using the formula, that school district should serve 8.6751 % of students in special education (column 5), or a difference of 0.28210 % (column 6). This adjusted percentage was obtained by using the school district's ITBS score (achievement) of 60.0; the enrollment (size) of 546; and the percentage of students receiving free and reduced price lunches (% free lunch) of 17.30 and entering the numbers into the formula as follows:

$$\% \text{ in special education} = 15.88356495 - 0.13684207 \text{ (achievement)} + 0.00008609 \text{ (size)} + 0.07008487 \text{ (\% free lunch)}$$

$$\% \text{ in special education} = 15.88356495 - 0.13684207 (60.0) + 0.00008609 (546) + 0.07008487 (17.30)$$

$$\% \text{ in special education} = 8.6751$$

While use of the prediction model to determine proportions of special education students would allow for differences among school districts, it would limit the current range (3% to 17%) of proportions of special education students in school districts. Use of the prediction model would decrease this range from slightly below 7% to a high of 13%. Since dollars follow students in special education in Iowa's school finance system, this would also equalize distribution of available funds for special education.

Summary

Measures of demographic, achievement, and socioeconomic factors have been found to relate to less than 17% of the differences found in the proportions of special education students in school districts. The present study does not account for most of the variance found in proportions of special education students but it does suggest a method for adjusting the allocation of funds for the significant factors identified in the study. While it does appear that district size, achievement, and percentage of students receiving free and reduced lunch are factors relating to the proportions of special education students, the relationship is not of the magnitude that has been suggested by many critics of plans to equalize the allocation of special education funds among school districts.

CHAPTER V

DISCUSSION

This chapter includes a summary of the study and a discussion of selected findings and their implications. Conclusions based upon the findings and recommendations, including suggestions for further research, are also presented.

Summary

Beginning in 1975, schools have been required to provide an appropriate program for all students with disabilities in need of special education. Since this mandate the number of special education students and the cost of providing special education services have markedly increased. This situation has caused both professionals and policy makers to begin asking questions about who should be served in special education and how these programs can be best funded.

Policy makers in Iowa have become increasingly concerned as steady increases in the numbers of special education students and the rising costs of the services are occurring at a time when many are questioning the state's ability to continue to fund all facets of education at current levels. Several studies have assessed Iowa's special education funding system with recommendations for changes in funding patterns that would limit overall costs and distribute available dollars on a more equitable basis. In general, these studies have proposed that a special education finance system should be based upon an average incidence rate, with districts receiving funding for a predetermined proportion of their students. Such proposals have been met with general disfavor among school district personnel who point to demographic, achievement, and socioeconomic factors beyond the

control of the school which, in their opinion, contribute to the wide variation in proportions of students served in special education in Iowa school districts.

A review of related literature yielded little definitive information relative to the factors which account for variations in proportions of students in special education Most of the general school finance literature has studied the revenue side of the finance equation, focusing on issues of equitable tax burden for taxpayers. There was general agreement among previous researchers that determining how many students should be served is central to the issue of funding special education. Earlier studies of the relationship of demographic, achievement, and socioeconomic factors to proportions of students served in special education have produced conflicting results.

The purpose of this study was to analyze the relationship of demographic, achievement, and socioeconomic factors to the proportion of special education students in Iowa school districts and AEAs. A central question was whether these relationships justified the wide variations among school districts in proportions of students served in special education, a range currently from a little more than 3% to over 17%. Finally, a prediction equation incorporating these related factors was developed that might be applied to each school district to determine how many students should be in special education programs. The prediction equation may assist policy makers in making decisions about how money should be distributed to support special education programs.

Findings and Their Implications

Findings are organized around the four research questions addressed in this study. The first research question looked for relationships between school district demographic, achievement, and socioeconomic factors and the proportions of students in special education. Eight variables thought to be indicators of the demographic, achievement, and

socioeconomic characteristics of school districts and the proportion of special education students were tested. The variables were: district size, population density, pupil-teacher ratios, adult education level, student achievement, average gross income, property value, and percentage of students receiving free and reduced price lunches. Six of the eight variables were significantly related to the proportion of students in special education. These six were: district size, pupil-teacher ratios, adult education level, student achievement, average gross income and percentage of students receiving free and reduced price lunches. However, the magnitude of the correlations was low ($r = .11$ to $r = .31$), rendering questionable the practical application of some of these relationships.

Multiple regression analysis identified three factors which accounted for approximately 17% of the variance among school districts in proportions of special education students. These were district size, student achievement, and percentage of students receiving free and reduced price lunch. Higher special education proportions were related to larger district size, lower achievement, and higher levels of poverty (as measured by eligibility for free and reduced price lunch). The variability in the proportions of special education students can be explained in part by the demographic, achievement, and socioeconomic variables examined in this study. The magnitude of these relationships, however, means that most of the variations among districts are not due to demographic, achievement, or socioeconomic characteristics.

The significance of some of the relationships is particularly small when viewed in the light of related literature on the subject. Earlier research (Marinelli, 1976; Leppert & Routh, 1980; McCarthy & Sage 1982; Chalfant, 1967) cited large school district size and population density as factors related to higher proportions of students in special education. McCarthy and Sage went so far as to suggest that an "urban multiplier" be applied to any special education finance formula to compensate for this difference in need. The current

study found that little more than 1% of the variance in proportions of students in special education was related to district size; no significant relationship existed with population density. Certainly any "urban multiplier" applied to Iowa's special education funding formula would indeed be small and inconsequential.

Patrick and Reschly (1982) found that education level, as measured by median number of school years completed by persons 18 years and over, accounted for 62% of the variance among states in the prevalence of mental retardation. By contrast, this study found only 1% of the variance among school districts in proportions of special education students to be related to the percentage of adults lacking a high school diploma. It is critical to note that the former study concentrated on variations between states in one category of disability (mental disabilities) while this study examined variations in overall proportions of students in special education between school districts within the same state.

Previous studies of socioeconomic variables related to proportions of students in special education produced conflicting conclusions. In general, studies conducted prior to widespread implementation of mandated services to students with disabilities and state funding systems found that higher socioeconomic status was related to higher prevalence of special education students (Wilken & Porter,1976; Chalfant, 1967). It is likely that when special education services were neither required nor financed by the state, wealthier school districts would provide more special education services. Other, more recent, research has substantiated the relationship between low socioeconomic status and high proportions of students in special education (Rossmiller, 1969; Patrick & Reschly, 1985; Zill, 1985; Noel & Fuller 1985). Zill (1985) reported that teachers judged over twice as many students from low income families to be learning disabled and eight times as many as behavior disordered. These estimates were based on interviews with regular education teachers. It is important to note that this study did not indicate whether actual diagnosis and special

education placement of students matched these teacher estimates of need. By contrast, the strongest indicator of poverty in the current study (percentage of students receiving free and reduced price lunches) related to only 9% of the variance in proportions of students in special education.

Several observations might help to explain the discrepancies in these results. A closer inspection of the earlier literature reveals than in most of these studies the relationships between the demographic, achievement, and socioeconomic variables were either hypothesized or based upon few actual cases. In many instances, the relationships were assumed to exist in order to explain observed differences across states or school districts in proportions of students served in special education. Research conducted by Patrick and Reschly (1982) was similar to this study; however, they looked at demographic, achievement, and socioeconomic variables at the state level instead of at a school district level. Many of the earlier studies examined the relationships of demographic, achievement, and socioeconomic variables to a particular category of disability (Patrick & Reschly, 1982; Schwenn et al., 1987). It would be expected that these studies would find stronger relationships between the variables as it has been well established in the literature that the incidence of mild mental retardation is related to socioeconomic factors (Patrick & Reschly, 1982). Unlike prior literature on this subject, the current study was based upon an empirical analysis of a large number of school districts within the same state and included all disability categories.

Another factor that might account for differences in prior and current results is that previous research has either gathered data at the national level or has focused on a state other than Iowa. Some of the differences in the outcomes of this study might be attributable to differences among states and unique features of Iowa. For example, Iowa is a rural state with a comparatively homogeneous population. Urban centers have been cited

as a factor in high proportions of students served in special education (Leppert & Routh 1980; Chalfant 1967). However, these data were gathered in Illinois and Florida where there are high minority populations and urban areas much larger than any found in Iowa. While size of school district related to only 1% of the variance in proportions of special education students found in Iowa cities such as Des Moines, Davenport, and Cedar Rapids, the relationship could be much stronger when tested in states with cities the size of Chicago or Miami.

Iowa also is noted for high achievement and literacy levels. Both were consistently high across the Iowa school districts in this study. For this reason, the variance on such measures as school achievement appeared more restricted than might be the case in other states. The normal curve equivalent scores on the Iowa Test of Basic Skills ranged from 50.50 to 73.60. Within this rather narrow range, achievement was found to be related to about 9% of the variance in proportions of special education students. Studies of other populations with greater diversity in achievement might produce a more substantial relationship between achievement and proportions of students in special education. Similarly, Patrick and Reschly (1982) found that adult education level was a strong predictor of the incidence of mental retardation across states. The current study included census data which identified a range from 0% to 7% of adults within school districts lacking a high school diploma. Due to the generally high literacy rate in Iowa, on average less than 0.5% of adults in Iowa were found to be lacking a high school diploma. Again, one might expect a stronger relationship between the predictor variable and the proportions of students in special education in a more diverse population.

The current study did find significant relationships between several of the demographic, achievement, and socioeconomic factors and the proportion of special education students, confirming several of the original hypotheses. The magnitude of the

relationships were uniformly low despite reasonably large variations in most of the predictor variables, especially district size and percentage of students receiving free and reduced price lunches, and large variation in the criterion variable of proportions of special education students. The large variations in most of the predictor variables as well as in the criterion variable means that the absence of substantial relationships cannot be attributed to restriction of range phenomena. It appears that there is a relationship, though weak, which can account for a small part of the variations in proportions of students served in special education.

The second research question examined the relationship of the demographic, achievement, and socioeconomic factors to the proportion of special education students in AEAs. Few consistent findings at the AEA level of the analysis were noted. Achievement was the most consistently significant variable ($p < .01$ or .05 in 7 of 15 AEAs). Instances of isolated, high correlations seemed to be idiosyncratic to a particular AEA. These high correlations are most likely explained by the interaction of the variables within a particularly large school district comprising much of the population of the AEA. For example, there was a high correlation between low property value and proportions of students in special education in AEA 9. Davenport, the second largest school district in Iowa and located in AEA 9, has high proportions of students in special education and low property values. Because the correlations were weak in the statewide analysis, the smaller number of cases in the AEA analysis would logically lead to fewer significant variables being identified.

The relationships of each of the variables to proportions of special education students by AEA were plotted on a scatter graph. In this analysis, one AEA consistently was most divergent from predicted special education proportions. When variables related to proportions of special education students were accounted for, this AEA still exceeded the predicted proportions.

The third research question examined differences in the strength of the relationship between the independent variables and two categories of special education students: mild/moderately disabled and severely disabled. Four variables were found to correlate more highly with proportions of students served in programs for mild/moderate disabilities. These were: pupil teacher ratios, achievement, average gross income, and percentage of students receiving free and reduced price lunches.

These findings seem to support other research which has suggested that there are really two types of students with disabilities: a) those with organic impairments, sometimes called the "hard" category; and b) those with situationally determined disabilities, sometimes referred to as the "soft" category (Noel & Fuller, 1985; Gelb & Mizokawa, 1986; Reschly, 1988a; Edgar and Hayden, 1985). Students in the second category, roughly corresponding to the 1.68 and 2.35 weighted categories in Iowa, are typically labeled mildly mentally disabled, learning disabled, or behavior disordered. In Iowa, these students represent over 75% of students served in special education. Because the identification of mild/moderate students is based on situationally specific factors and relative judgments, it is expected that the incidence of these students would be more closely tied to demographic, achievement, and socioeconomic factors. Findings in this study are consistent with those of Gelb and Mizokawa (1986) who found "soft" categories of disabilities to be more highly correlated with social and demographic variables. The current study, however, is the only one to look at demographic, achievement, and socioeconomic variables at a school district level and relate them to proportions of students served in programs for the mild/moderately disabled.

The fourth research question addressed the issue of developing a model to predict the school district's proportion of students that should be served in special education. All of the independent variables were entered into a forward, stepwise, multiple regression

procedure. From this analysis, three variables were determined to be useful in predicting proportions of students in special education: student achievement, district size, and percentage of students receiving free and reduced price lunches. Based upon the prediction equation, percentages of students who should be in special education were then calculated for each school district. Large differences between actual and predicted proportions of special education students exist for many districts (See Appendix B). These large variations suggest a need to further study factors that influence proportions of students in special education and how these might be addressed through funding policies.

Earlier studies of special education finance in Iowa (Howe, 1978; Bradley, 1982; Burgett, 1985) cited the need to investigate the range of proportions of special education students in school districts and AEAs and the potential need to place limits on future growth of the special education population, particularly the mildly disabled population. Through the development of a prediction model, a basis now exists to both manage future funding and predict patterns of identification in school districts.

Conclusions

Critics of the current special education funding system have observed that there are two ways to generate money for public school education in Iowa: through legislative appropriations for all students and through decisions of special education staffing teams which trigger expenditures of additional dollars for special education. Each student identified for special education by a staffing team is assigned a weighting commensurate with identified needs. The current weightings of 1.68, 2.35, and 3.52 generate approximately $2300, $4500 and $8500, respectively, in addition to dollars the school district would receive for that same student in regular education. These additional dollars for special education are funded by the state at the foundation level, which means that 79%

comes from the state and 21% is funded at the district level regardless of the wealth of the school district. The identification of students for special education thus drives the generation and the distribution of state funds.

Currently, special education funds are distributed differentially among school districts according to the proportion of students being served in special education. These inequities have been justified on the basis of the uniquely different demographic, achievement, and socioeconomic characteristics of Iowa school districts. Results of this study indicate that these differences are statistically significant but weak. The relationships do not explain or justify the current large variations among school districts in proportions of special education students.

By applying the prediction model developed in this study, it would be possible to provide direction for the future funding of special education and also equalize the distribution of available funds. This would have several advantages. Policy makers are suspicious of an escalating special education population and the large variations in that population (3% to 17%) between school districts. These percentages are often cited as evidence that some school districts are serving students in special education who should not be there; or worse, that school districts are generating special education dollars for students who are not enrolled in special education programs. Shortfalls in state revenues have resulted in state appropriations for special education being frozen at current rates and in downward adjustments in the state foundation level support for special education. This has affected all school districts equally; those school districts with 3% of their students in special education as well as those with 17% in special education. Funding special education on the basis of predicted incidence rates might establish the credibility necessary to protect full state funding as well as redistribute available state funds more evenly across school districts.

The second advantage to implementation of the prediction model is that it would support current efforts in the state to reconceptualize services to low achieving and mildly disabled students. The inexact nature of the identification process for mildly disabled students has been confirmed in much of the literature (Reschly, 1988; Edgar & Hayden 1985). Funding on the basis of predetermined percentages of the total school population would eliminate the need to distinguish between slow learners and students with mild disabilities, both in terms of their identification and treatment.

There would also be disadvantages to funding special education on the basis of predetermined percentages. The incidence rate of students with organic impairments or those considered to be in the "hard" categories of disabilities is low; estimated by some to be around 2% of all students (Edgar & Hayden, 1985). In Iowa, less than 1% of all students are in programs for students with severe disabilities. Programs for these students are typically the most expensive. Estimating proportions of students to be served in these high cost, low incidence rate categories by using statistical predictions could be problematic given the small size of many Iowa school districts. In the most extreme circumstance, one family with three severely disabled students could move into a school district with 128 students and increase the incidence rate from zero to 3%. For this reason, it might be well to consider continuing to fund students with severe disabilities (3.52 weighting) on an individual child basis.

Many special education advocacy group members and special education professionals will view change from the current student driven funding system to a system based upon predetermined proportions of special education students as a threat to the integrity of services for special education students in Iowa. This view mistakenly equates the dollars generated on behalf of each student with the guarantee that the student will

receive appropriate services. Staff development and parent training, however, would need to accompany any proposed change in the special education funding system.

A funding system based upon the prediction model developed in this study would create significant changes in the funding level of a substantial number of school districts. Before implementing such change, there is a need to examine additional factors which influence the proportions of students served in special education. The present study has established a statewide data base which could provide a means to control for the differences in schools as measured by the eight variables included in this study. The literature suggests that decisions that place students in programs for mild/moderately disabled are somewhat subjective and situationally defined. Such decision making needs to be further investigated by conducting case studies of school districts serving widely discrepant proportions of special education students, controlling for the variables used in this study. The case study analysis should be conducted at the building level and look at such things as attitudes toward special education, the amount of diversity within the school population, teacher experience and methods, and the tolerance for diversity among both students and teachers. This research could assist in understanding what remains unexplained about the variations in proportions of special education students.

Recommendations

Based upon the findings of this study it is recommended that the Department of Education should support policy and procedures which would lead to a more equitable and effective distribution of funds for special education in Iowa. This might include the following:

1. Annually publishing a statewide list by school district and by AEA with the proportions of special education served in each, along with the average weighting assigned. As a result of this study, this information is now on a data base and could easily be updated each year. Such information could lead to local efforts to approximate an average incidence rate.
2. Conducting case studies in school districts which represent the "outliers" in terms of proportions of special education students. Such case studies might yield useful information about the characteristics of school buildings and districts with both unusually high and low proportions of special education students.
3. Supporting long range plans which would phase in a consistent level of financial support for special education programs for students with mild/moderate disabilities in each school district in Iowa. Funding would be based upon the predicted incidence levels developed in this study as well as any other adjustments determined to be necessary as a result of the case studies. These changes should be gradually implemented along with appropriate staff development activities to assist school districts in providing alternative ways of programming for students with special needs.
4. Investigating the relationship of Chapter 1 compensatory education programs and proportions of students in special education. One of the findings from earlier research on a nationwide level was that states serving fewer students in Chapter 1 served proportionately more in special education (Noel & Fuller, 1985). This would be worthy of investigation on a state level. As has been suggested, Chapter 1 programs are less expensive and may more appropriately address the needs of some students now being served in special education (Reschly, 1988b).

The current study has contributed to an understanding of the relationships between demographic, achievement, and socioeconomic variables and proportions of students served in special education in school districts and AEAs in Iowa. This information was used to develop a prediction equation for determining what proportion of students should be served in special education. Only a small part of the overall variance in proportions of students served in special education was found to be related to the factors included in the present study. Further study of additional factors which may be related to proportions of students served in special education is necessary in order to assist in the formulation of recommendations for change in the current funding system for special education.

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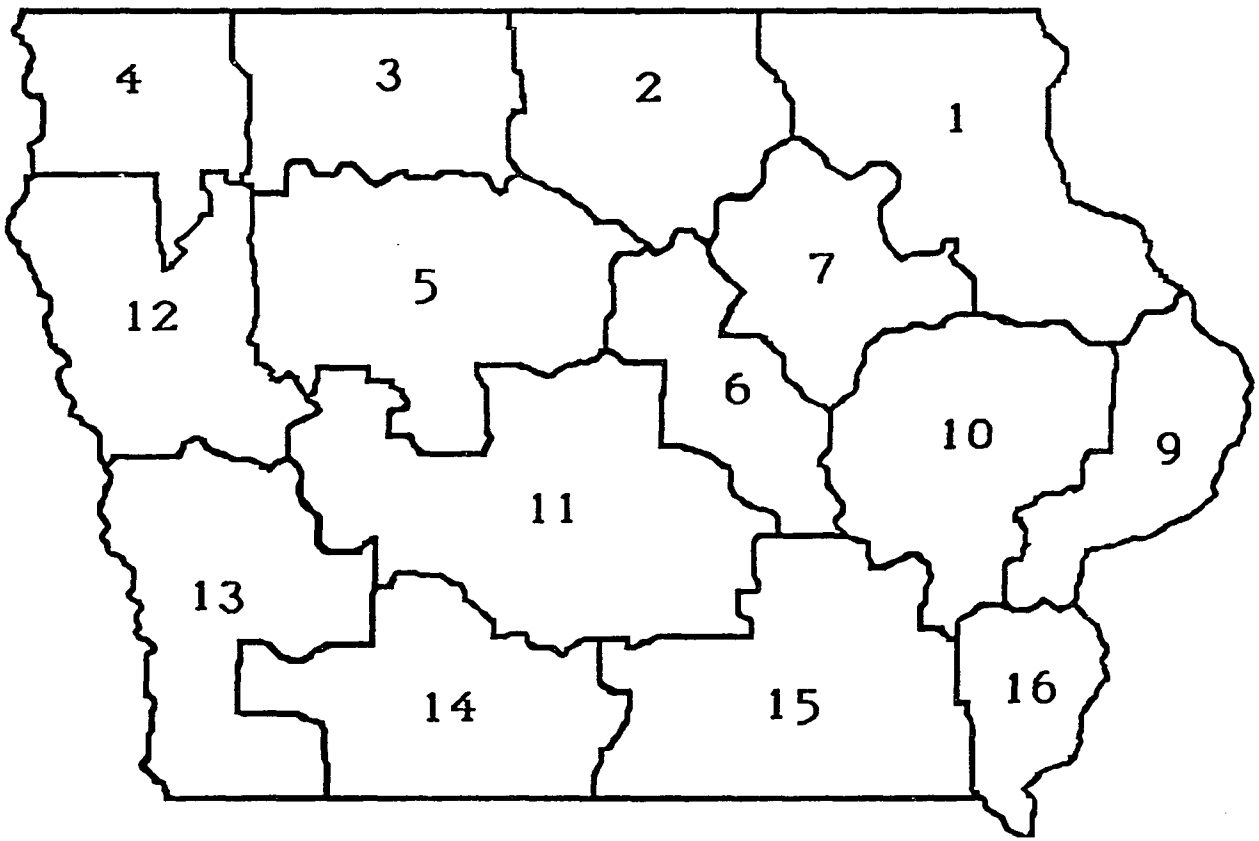
APPENDIX A

IOWA'S AREA EDUCATION AGENCIES



APPENDIX B

FUNDING IMPLICATIONS FOR LOCAL SCHOOL DISTRICTS

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
1	1	135	8.8664	8.7530	-0.11333
2	1	1080	6.5773	9.6305	3.05314
3	1	1638	8.3016	7.9046	-0.39709
4	1	1863	10.8432	10.5828	-0.26046
5	1	1989	7.1429	8.8808	1.73796
6	1	2349	8.8305	7.9846	-0.84596
7	1	2394	7.6720	9.1667	1.49476
8	1	2763	10.8585	7.8843	-2.97422
9	1	3029	7.2219	9.1740	1.95207
10	1	4043	6.8252	7.7260	0.90080
11	1	4095	9.6886	9.2251	-0.46351
12	1	4419	10.0132	9.3574	-0.65582
13	1	4662	6.6384	8.7138	2.07538
14	1	4774	8.6735	9.0418	0.36830
15	1	4787	15.7895	9.7811	-6.00833
16	1	4869	8.5681	9.7819	1.21379
17	1	5310	9.1185	8.4774	-0.64118
18	1	5508	7.7052	8.0344	0.32918
19	1	6100	14.9169	8.9254	-5.99148
20	1	6175	6.5401	9.2043	2.66419
21	1	6509	6.9552	8.2188	1.26359
22	1	6591	8.3026	9.2056	0.90306
23	1	6943	7.2495	8.3576	1.10817
24	1	6950	6.1515	8.8537	2.70221
25	1	6961	14.8163	9.8130	-5.00323
26	2	594	9.4911	8.5913	-0.89975
27	2	819	9.4215	8.9635	-0.45800
28	2	873	8.9524	8.4262	-0.52622
29	2	916	8.8980	9.0373	0.13924
30	2	1116	10.9825	9.9574	-1.02507
31	2	1233	8.8554	8.7374	-0.11806
32	2	1449	13.4409	7.8260	-5.61487
33	2	1872	10.6557	10.4515	-0.20425
34	2	2403	10.1660	8.2008	-1.96518
35	2	2664	7.0000	8.2743	1.27435
36	2	2781	7.3235	9.1285	1.80504
37	2	3276	14.2857	9.9918	-4.29389
38	2	3366	14.2857	9.6341	-4.65165
39	2	3420	8.6035	8.2780	-0.32549
40	2	4131	10.8585	9.2368	-1.62167
41	2	4266	5.1948	8.9416	3.74677
42	2	4761	13.3087	9.0901	-4.21860

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
43	2	4772	9.7039	8.4716	-1.23237
44	2	4788	7.7465	8.5695	0.82300
45	2	4995	11.3799	8.5050	-2.87496
46	2	5616	7.5377	7.8423	0.30464
47	2	5697	7.9511	9.4644	1.51336
48	2	5751	10.6038	8.4324	-2.17142
49	2	5922	9.2637	9.9503	0.68666
50	2	6363	11.1801	8.7009	-2.47918
51	2	6633	6.2914	7.9584	1.66700
52	3	126	14.1269	8.9043	-5.22252
53	3	333	8.9253	9.6380	0.71267
54	3	900	12.8571	9.2792	-3.57796
55	3	1218	5.4348	8.5811	3.14635
56	3	2088	14.2045	9.5103	-4.69426
57	3	2124	8.7989	9.8628	1.06390
58	3	2133	11.2150	8.3107	-2.90427
59	3	2556	7.0122	10.0970	3.08478
60	3	2846	5.9322	9.2282	3.29603
61	3	3700	8.7273	10.3438	1.61655
62	3	3897	9.0226	8.4108	-0.61174
63	3	3969	6.0185	10.0090	3.99044
64	3	4778	10.7143	9.6598	-1.05444
65	3	5724	10.1227	10.4510	0.32828
66	3	6050	8.0645	9.0674	1.00286
67	3	6092	5.9925	9.0374	3.04487
68	3	6102	9.4010	9.0786	-0.32233
69	3	6120	8.3333	8.6348	0.30145
70	3	6345	9.1912	9.3414	0.15025
71	3	6417	8.7500	8.6007	-0.14927
72	3	6921	8.5005	7.4077	-1.09285
73	4	747	10.7607	7.8782	-2.88247
74	4	1095	7.5968	9.4767	1.87996
75	4	2268	8.5011	7.9523	-0.54880
76	4	2457	5.8824	8.5167	2.63437
77	4	2862	9.3240	8.2138	-1.11023
78	4	3771	7.3171	8.9222	1.60514
79	4	4068	6.4302	7.7449	1.31475
80	4	4149	5.6006	7.6857	2.08517
81	4	4248	8.5106	8.1939	-0.31671
82	4	5157	6.6046	9.3713	2.76669
83	4	5346	4.1045	9.6955	5.59097
84	4	5607	13.9942	9.0147	-4.97945
85	4	5949	10.6897	8.7740	-1.91564
86	4	5994	12.1875	9.0960	-3.09152
87	4	6030	9.0461	7.7883	-1.25780
88	4	6291	12.6582	8.5626	-4.09561
89	4	6983	10.6667	8.1122	-2.55448

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
90	4	6990	11.7035	9.6557	-2.04779
91	5	72	9.1584	9.0783	-0.08014
92	5	171	11.3402	9.4685	-1.87176
93	5	1055	5.9574	10.0535	4.09604
94	5	1097	9.5941	10.3005	0.70639
95	5	1206	9.3257	8.6920	-0.63372
96	5	1854	8.1967	9.0163	0.81954
97	5	1944	12.5666	10.0038	-2.56280
98	5	1967	11.8598	10.4510	-1.40884
99	5	2277	17.2414	12.0685	-5.17291
100	5	2313	11.1647	11.1802	0.01543
101	5	2493	14.5669	10.0841	-4.48284
102	5	2529	16.8539	9.1221	-7.73181
103	5	3060	10.8339	8.4695	-2.36440
104	5	3195	9.0615	9.2354	0.17393
105	5	3411	6.4799	8.5235	2.04369
106	5	3447	11.9565	10.4764	-1.48009
107	5	3537	10.0548	8.5502	-1.50461
108	5	3807	5.0847	10.7446	5.65988
109	5	3915	4.0268	9.6673	5.64050
110	5	4023	6.8093	8.8804	2.07107
111	5	4644	11.2462	8.6927	-2.55350
112	5	4775	11.0497	8.6943	-2.35542
113	5	4786	5.1903	9.1201	3.92974
114	5	4860	6.7073	9.8118	3.10449
115	5	5103	6.0606	10.0457	3.98512
116	5	5139	9.2937	10.5272	1.23352
117	5	5283	10.3425	9.1209	-1.22161
118	5	5301	5.4608	8.7578	3.29710
119	5	5323	9.4400	9.1256	-0.31438
120	5	5625	6.4151	8.3555	1.94044
121	5	5652	12.4424	10.1986	-2.24382
122	5	5742	6.7708	8.7849	2.01410
123	5	5823	7.7193	8.1418	0.42248
124	5	6048	6.4607	8.8998	2.43910
125	5	6095	6.4474	9.2966	2.84919
126	5	6219	10.2198	8.2636	-1.95614
127	5	6246	5.8537	7.8631	2.00944
128	5	6516	11.4943	9.9685	-1.52573
129	5	6741	7.6118	9.4666	1.85479
130	5	6867	10.2414	9.5943	-0.64713
131	6	9	7.2993	8.4249	1.12558
132	6	108	8.8942	9.2069	0.31262
133	6	540	9.7892	8.3375	-1.45169
134	6	846	9.7451	8.9519	-0.79322
135	6	2007	8.7763	9.6372	0.86095
136	6	2502	8.2781	7.9793	-0.29889

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
137	6	2682	13.4259	8.9988	-4.42715
138	6	2709	12.1144	8.4486	-3.66583
139	6	3150	8.1585	9.3565	1.19798
140	6	3582	6.9383	8.4382	1.49990
141	6	4104	13.0654	9.1484	-3.91696
142	6	4437	4.7535	8.0252	3.27172
143	6	5391	7.0234	9.6693	2.64589
144	6	6098	12.4479	10.6323	-1.81555
145	6	6894	6.8437	7.9314	1.08771
146	6	6985	9.7531	8.5268	-1.22624
147	7	153	7.3298	9.1140	1.78416
148	7	279	4.6569	8.8418	4.18489
149	7	1044	10.2646	8.2837	-1.98091
150	7	1215	9.1518	8.8059	-0.34593
151	7	1719	6.9482	7.6861	0.73791
152	7	1791	6.4885	7.5467	1.05813
153	7	1908	8.4559	9.1598	0.70387
154	7	1935	7.5236	8.2146	0.69100
155	7	1963	10.3448	8.7454	-1.59939
156	7	2727	10.3555	8.1310	-2.22452
157	7	3042	8.6287	7.5755	-1.05318
158	7	3105	10.6936	9.5719	-1.12177
159	7	3186	9.5694	8.8429	-0.72648
160	7	3204	7.1979	8.3460	1.14806
161	7	3501	9.5029	8.6781	-0.82486
162	7	4599	6.2500	9.1236	2.87363
163	7	4671	10.4278	9.7601	-0.66772
164	7	4785	7.9258	8.4953	0.56953
165	7	5130	8.1031	7.9592	-0.14390
166	7	5238	6.1017	8.0132	1.91151
167	7	5472	7.9012	8.2784	0.37716
168	7	6273	7.5269	7.9888	0.46192
169	7	6471	10.1952	8.9418	-1.25346
170	7	6762	6.4792	8.4697	1.99049
171	7	6795	12.2839	11.9605	-0.32337
172	7	6840	7.7483	7.8213	0.07300
173	9	243	8.2540	9.7561	1.50210
174	9	585	8.3947	9.1580	0.76330
175	9	603	5.4313	9.1392	3.70792
176	9	621	6.4811	7.7173	1.23628
177	9	918	9.0020	9.3078	0.30580
178	9	936	9.5111	8.9180	-0.59316
179	9	1082	8.3930	8.6751	0.28210
180	9	1278	8.7423	9.3189	0.57656
181	9	1368	5.5682	9.0301	3.46191
182	9	1611	10.0458	12.3555	2.30971
183	9	1675	6.2044	7.6450	1.44065

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
184	9	1926	8.0620	7.6829	-0.37909
185	9	1965	10.2662	8.6549	-1.61131
186	9	3834	5.3763	10.1255	4.74915
187	9	3841	6.4356	9.0061	2.57048
188	9	4041	12.1437	10.1111	-2.03263
189	9	4581	9.0455	10.7530	1.70747
190	9	4773	9.2288	8.1897	-1.03914
191	9	4784	6.0794	7.7441	1.66466
192	9	5250	6.1446	7.4567	1.31204
193	9	5337	10.5960	10.0356	-0.56041
194	9	6975	5.8970	9.8839	3.98693
195	9	7038	9.0255	9.2757	0.25025
196	10	99	7.9460	7.4989	-0.44710
197	10	216	7.8125	9.1808	1.36825
198	10	234	9.0560	9.2718	0.21580
199	10	576	9.6639	10.0589	0.39499
200	10	609	8.6884	8.6416	-0.04675
201	10	1053	11.1941	11.2297	0.03562
202	10	1062	6.0755	9.4675	3.39196
203	10	1089	8.6081	9.1742	0.56610
204	10	1188	6.6955	8.6427	1.94721
205	10	1221	7.5676	8.6186	1.05098
206	10	1337	7.6725	8.6343	0.96182
207	10	1647	8.0402	8.6889	0.64865
208	10	2097	9.6070	9.3998	-0.20716
209	10	2977	6.2963	9.4084	3.11210
210	10	3141	6.7361	8.7837	2.04758
211	10	3154	10.5181	8.9678	-1.55026
212	10	3691	7.3204	9.0803	1.75997
213	10	3715	5.8575	7.3782	1.52066
214	10	3744	6.8056	8.4467	1.64111
215	10	3816	4.9140	8.4195	3.50546
216	10	4086	8.8348	8.2098	-0.62503
217	10	4269	8.9520	9.9500	0.99800
218	10	4271	6.9901	9.3568	2.36669
219	10	4446	6.9597	8.9205	1.96078
220	10	4554	6.0109	7.4390	1.42805
221	10	4777	6.5217	8.3448	1.82303
222	10	4806	5.9347	9.0923	3.15757
223	10	4905	10.0000	8.4216	-1.57836
224	10	5076	9.0909	9.8877	0.79677
225	10	5967	8.8312	9.8375	1.00629
226	10	6093	7.3944	8.0490	0.65459
227	10	6138	9.5031	8.3495	-1.15352
228	10	6408	6.0345	9.3554	3.32093
229	10	6570	8.9686	9.2176	0.24894
230	10	6660	9.3515	9.5061	0.15460

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
231	10	6768	8.6678	8.6310	-0.03686
232	10	6930	5.9603	8.7293	2.76907
233	10	7029	8.3427	7.5504	-0.79225
234	11	18	10.7759	9.4974	-1.27848
235	11	27	7.6923	8.0781	0.38582
236	11	261	6.0648	7.2474	1.18251
237	11	414	7.8292	7.9165	0.08727
238	11	472	10.3535	8.1484	-2.20509
239	11	513	13.6076	8.4636	-5.14395
240	11	720	9.0433	7.9798	-1.06342
241	11	729	9.9006	8.2911	-1.60942
242	11	981	10.9264	9.0138	-1.91257
243	11	999	8.4915	8.5230	0.03157
244	11	1091	10.9589	8.7147	-2.24419
245	11	1332	10.4513	8.9382	-1.51315
246	11	1350	6.9767	8.1730	1.19624
247	11	1359	9.2784	8.2400	-1.03837
248	11	1413	5.7851	9.8579	4.07279
249	11	1413	5.7851	9.8579	4.07279
250	11	1576	7.4255	8.1317	0.70616
251	11	1737	11.5498	13.0391	1.48938
252	11	1770	9.9778	9.2945	-0.68332
253	11	1953	8.2405	9.2887	1.04817
254	11	2151	5.5866	9.8978	4.31120
255	11	2466	8.9623	7.2080	-1.75431
256	11	2520	6.4220	8.8501	2.42812
257	11	2570	12.4260	10.4434	-1.98267
258	11	2754	8.7629	8.7236	-0.03933
259	11	3114	9.2177	8.8723	-0.34534
260	11	3119	12.8440	9.8375	-3.00649
261	11	3231	6.2559	6.8706	0.61468
262	11	3375	9.7725	9.4333	-0.33912
263	11	3906	9.4675	8.5859	-0.88156
264	11	3942	7.8859	8.1131	0.22719
265	11	4014	3.1189	8.6639	5.54496
266	11	4122	8.2759	8.4234	0.14755
267	11	4212	7.4074	9.5263	2.11885
268	11	4617	10.5788	8.4596	-2.11927
269	11	4725	11.5502	9.0031	-2.54713
270	11	4779	9.6257	7.6579	-1.96777
271	11	4797	9.5053	8.7415	-0.76380
272	11	4878	8.4615	8.7843	0.32280
273	11	5121	8.4416	9.2260	0.78447
274	11	5166	6.5841	6.9480	0.36392
275	11	5184	11.9695	8.8868	-3.08270
276	11	5256	7.8910	9.0810	1.19003
277	11	5319	8.9504	8.4211	-0.52936

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
278	11	5643	8.6310	8.1173	-0.51362
279	11	5805	12.1355	9.3205	-2.81508
280	11	6094	11.3178	8.1278	-3.18999
281	11	6101	7.4471	8.5888	1.14167
282	11	6264	8.1917	9.4694	1.27778
283	11	6512	9.2369	9.0657	-0.17128
284	11	6561	8.4746	6.3530	-2.12153
285	11	6579	6.4636	6.5515	0.08786
286	11	6615	9.2308	8.6058	-0.62494
287	11	6822	9.5436	7.3617	-2.18184
288	11	6957	7.7277	7.2994	-0.42827
289	11	7056	9.3038	9.8808	0.57696
290	11	7110	8.1862	8.9023	0.71615
291	12	63	11.6949	9.8139	-1.88100
292	12	270	8.9080	10.3618	1.45373
293	12	355	10.5761	8.3982	-2.17790
294	12	423	8.7282	8.6717	-0.05645
295	12	504	11.0345	10.5824	-0.45206
296	12	1134	8.2621	9.4891	1.22695
297	12	1701	9.3023	9.3532	0.05083
298	12	1845	8.7838	9.3913	0.60747
299	12	1969	8.9147	10.1402	1.22551
300	12	1975	8.2902	10.1274	1.83721
301	12	2376	6.1611	7.8417	1.68061
302	12	2988	7.5439	8.0721	0.52821
303	12	3096	9.8039	9.0101	-0.79382
304	12	3348	6.4000	8.7814	2.38142
305	12	3555	9.4435	8.5246	-0.91893
306	12	3600	7.0663	8.3104	1.24414
307	12	3996	6.9919	9.5120	2.52016
308	12	4033	10.1873	10.7817	0.59442
309	12	5486	11.6785	9.8753	-1.80316
310	12	5832	6.4972	8.4016	1.90440
311	12	5877	10.8411	9.4905	-1.35067
312	12	6039	11.9016	11.0400	-0.86159
313	12	6987	11.3543	9.9382	-1.41612
314	12	6992	8.1411	9.2726	1.13148
315	12	7002	6.0748	7.7334	1.65865
316	12	7032	7.4906	10.2982	2.80759
317	12	7098	8.4175	9.1525	0.73502
318	13	252	12.8788	10.1780	-2.70076
319	13	387	10.3222	8.5045	-1.81774
320	13	441	7.7406	8.5209	0.78033
321	13	914	11.4198	10.6613	-0.75842
322	13	1008	11.3065	9.6452	-1.66132
323	13	1197	8.2797	8.7431	0.46348
324	13	1476	12.2642	10.7805	-1.48369

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
325	13	1917	10.2902	10.1394	-0.15083
326	13	2016	9.7959	8.2121	-1.58387
327	13	2113	8.8325	9.7254	0.89295
328	13	2205	4.2216	8.7150	4.49341
329	13	2369	11.5248	10.3338	-1.19103
330	13	2511	9.6722	9.3352	-0.33710
331	13	2718	9.2827	10.1275	0.84484
332	13	2772	13.7072	10.5436	-3.16359
333	13	2826	7.6766	8.3611	0.68449
334	13	3645	12.4856	9.8409	-2.64472
335	13	3798	10.2967	9.5974	-0.69931
336	13	3978	16.5138	10.2253	-6.28846
337	13	4356	12.4378	9.6307	-2.80714
338	13	4751	8.4746	8.9401	0.46551
339	13	4824	8.5339	9.3480	0.81410
340	13	5931	10.1770	8.6363	-1.54073
341	13	5976	9.7599	9.1803	-0.57958
342	13	6003	8.8095	9.3200	0.51045
343	13	6097	6.9738	9.2534	2.27952
344	13	6453	3.2609	7.5191	4.25820
345	13	6460	9.6009	9.3102	-0.29066
346	13	6534	8.7459	7.6355	-1.11038
347	13	6750	9.0323	9.6064	0.57416
348	13	6969	8.0357	10.5654	2.52971
349	13	7092	8.7629	9.9619	1.19898
350	14	549	16.0714	10.4419	-5.62958
351	14	792	7.6923	9.9042	2.21190
352	14	1093	16.4074	10.5605	-5.84689
353	14	1211	10.7392	10.2481	-0.49105
354	14	1224	11.1888	11.6672	0.47835
355	14	1431	8.9655	9.2067	0.24122
356	14	1503	9.2684	9.4400	0.17158
357	14	1782	15.3846	12.1469	-3.23770
358	14	1970	9.7674	10.8987	1.13129
359	14	2602	15.1685	12.1090	-3.05954
360	14	2673	7.4818	8.7036	1.22183
361	14	3465	10.1695	9.9154	-0.25406
362	14	3609	10.5590	10.2326	-0.32640
363	14	4505	13.7026	11.0060	-2.69661
364	14	4527	10.7994	9.5525	-1.24693
365	14	4572	10.8475	9.4699	-1.37758
366	14	4698	12.6761	10.1741	-2.50192
367	14	4978	9.5238	10.5958	1.07198
368	14	5328	11.7188	11.3028	-0.41600
369	14	5463	12.2507	8.6957	-3.55498
370	14	6165	10.9325	8.6512	-2.28128
371	14	6651	15.2893	9.1887	-6.10057

OBS	AEA	School Number	Actual % Spec Ed	Predicted % Spec Ed	Differences
372	15	81	11.0623	10.1123	-0.94998
373	15	657	10.5882	10.7273	0.13909
374	15	977	9.4101	10.5588	1.14865
375	15	1071	12.3615	11.1539	-1.20762
376	15	1107	10.6588	9.5922	-1.06662
377	15	1619	8.1921	9.8072	1.61509
378	15	1980	10.2256	9.9323	-0.29327
379	15	2169	9.9445	8.3626	-1.58190
380	15	2327	8.8235	10.2928	1.46924
381	15	2367	11.3445	9.5725	-1.77204
382	15	2834	7.8853	9.6729	1.78757
383	15	3330	8.7234	8.6365	-0.08691
384	15	4491	6.8584	10.5690	3.71059
385	15	4518	6.8627	10.3433	3.48060
386	15	4776	5.7143	8.6589	2.94460
387	15	5013	9.2900	9.7913	0.50129
388	15	5049	11.9118	11.4437	-0.46812
389	15	5163	9.8401	8.7999	-1.04020
390	15	5715	10.5263	10.5069	-0.01937
391	15	5895	9.4891	9.7554	0.26637
392	15	6012	9.3931	9.9273	0.53420
393	15	6462	10.4255	8.4910	-1.93452
394	15	6592	9.1176	9.1009	-0.01678
395	15	6854	8.4138	9.8929	1.47911
396	16	882	11.6026	10.5084	-1.09421
397	16	1079	7.1497	8.8984	1.74871
398	16	1602	9.6457	8.5966	-1.04903
399	16	2322	11.0852	9.2040	-1.88124
400	16	3312	11.9564	10.0097	-1.94674
401	16	4203	7.1429	8.0409	0.89807
402	16	4509	9.3897	10.6700	1.28035
403	16	4536	7.7241	9.0440	1.31989
404	16	4689	9.7561	8.9340	-0.82211
405	16	6700	6.9966	8.7424	1.74583
406	16	6759	10.9412	9.5509	-1.39026
407	16	6937	12.3967	8.7007	-3.69595
408	16	7047	11.5479	8.5959	-2.95197